

1. August 6, 2019 - Development And Planning Agenda

Documents:

[DPSC AGENDA - AUGUST 6, 2019.PDF](#)

[CITY OF SALMON ARM SOLAR PV FEASIBILITY REPORT - FINAL.PDF](#)



AGENDA
City of Salmon Arm
Development and Planning Services
Committee

Tuesday, August 6, 2019
8:00 a.m.
Council Chambers, City Hall
500 – 2 Avenue NE

Page #	Item #	Description
	1.	CALL TO ORDER
	2.	REVIEW OF AGENDA
	3.	DISCLOSURE OF INTEREST
	4.	PRESENTATIONS
	5.	REPORTS
1 - 22	1.	Development Variance Application No. VP-499 [0924020 BC Ltd. (T-1 Enterprises) and Dinoflex Holdings Inc.; 5731 Auto Road SE and 5590 46 Avenue SE; Fire Hydrant requirement]
23 - 34	2.	Development Variance Application No. VP-500 [Cowan, W. & S./Arsenault, G.; 4340 20 Street NE; Retaining Wall & Fence]
	6.	FOR INFORMATION
35 - 36	1.	Solar Feasibility Study
37 - 46	2.	Body Gripping Animal Traps
	7.	IN CAMERA
	8.	LATE ITEM
	9.	ADJOURNMENT

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TO: His Worship Mayor Harrison and Members of Council

FROM: Director of Development Services

DATE: July 24, 2019

SUBJECT: Development Variance Permit Application No. VP-499
Legal: Lot A, Section 5, Township 20, Range 9, W6M, KDYD, Plan 28401; and
Lot 1, Section 5, Township 20, Range 9, W6M, KDYD, Plan KAP59849
Civic Address: 5731 Auto Road SE and 5590 – 46 Avenue SE
Owner: 0924020 BC Ltd (T-1 Enterprises) and Dinoflex Holdings Inc.
Applicant: Owners

MOTION FOR CONSIDERATION

THAT: Development Variance Permit No. VP-499 be authorized for issuance for Lot A, Section 5, Township 20, Range 9, W6M, KDYD, Plan 28401 & Lot 1, Section 5, Township 20, Range 9, W6M, KDYD, Plan KAP59849, which will vary Development & Servicing Bylaw No. 4163 as follows:

Waive the requirement to install a fire hydrant to the minimum 90 metre spacing.

STAFF RECOMMENDATION

THAT: The motion for consideration be defeated.

PROPOSAL

This variance application includes two properties, 5731 Auto Road SE and 5590 – 46 Avenue SE. The properties are located in the Industrial Park and are across the street (Auto Road SE) from each other. (Appendix 1 & 2). The applicants are requesting to vary the provisions of the Subdivision and Servicing Bylaw No. 4163, by waiving the requirement to install two fire hydrants to meet the minimum spacing of 90 metres as specified for properties zoned industrial. This variance application includes two properties because the business owners have applied for a building permit at approximately the same time and are required to install one of the same hydrants (along Auto Road SE). The applicants have submitted letters of rationale attached as Appendix 3, and site photos are attached as Appendix 4.

BACKGROUND

Both properties are designated Industrial - General in the City's Official Community Plan (OCP) and are zoned M-1 General Industrial Zone in the City's Zoning Bylaw (Appendix 5 & 6).

T-1 Enterprises is a steel fabrication business located at 5731 Auto Road SE. Building Permit No. 16016B was issued for a 42' x 56' fabric building (SpanMaster Structures Ltd.) The building permit value is \$43,998. The fire hydrant is the only frontage improvement required and the estimated cost, including a standard 25% contingency is \$16,587.

Dinoflex Holdings Inc., located at 5590 – 46 Avenue SE, is the other property under application. Building Permit No. 16025B was issued for a 10,000 ft² addition with a building permit value of \$500,000. Frontage upgrades required for the building permit included two fire hydrants, one fire hydrant along 48 Avenue SE and, one fire hydrant along Auto Road SE. The fire hydrants are the only frontage improvements required, and the estimated cost including a standard 25% contingency is \$33,175. As the one fire hydrant along Auto Road is the same fire hydrant required for T-1 Enterprises, the two business owners each bonded for the cost of half of the hydrant (\$8,293.75).

Both properties have existing fire hydrants along their property frontages. The three closest fire hydrants to the subject properties are spaced approximately 130 metres apart and do not meet the required minimum spacing of 90 metres as specified in the Subdivision & Development Servicing Bylaw (Appendix 7).

STAFF COMMENTS

Fire Department

See attached referral comments (Appendix 8).

Building Department

No BC Building Code concerns.

Engineering Department

See attached engineering report (Appendix 9).

Planning Department

As per Subdivision & Development Servicing Bylaw No. 4163, all development (which includes building permits), are subject to the minimum servicing levels as specified in Table 1: Service Levels for Subdivision & Development (Appendix 10). Fire hydrants are included in the water service level and are to be spaced every 90 metres in industrial areas.

Industrial properties are exempt from frontage improvements if the footprint of expansion is equal to or less than 50m² (538 ft²). The building permit issued for T-1 Enterprises is for a 219 m² (2,352 ft²) building; and, the building permit issued for Dinoflex is for a 929 m² (10,000 ft²) addition. Therefore, both properties do not qualify for an exemption.

Although both properties are within the Industrial Revitalization Tax Exemption Area, only Dinoflex qualifies for an Industrial Revitalization Tax Exemption Application as the building permit value is \$500,000. Applications for Industrial Revitalization Tax Exemptions can only be made if the building permit value is in excess of \$300,000 (as determined by the City of Salmon Arm). Dinoflex has been approved for an Industrial Revitalization Tax Exemption.


Currently there are six active building permits in the industrial area, and four businesses out of the six, have a related variance application to waive the requirement to install fire hydrants (Appendix 11). One of the four applications, VP-497 for The Woodshop Millwork & Joinery Inc., located at 4921 Auto Road SE has an approved variance to install one fire hydrant. Due to the fact that there are two other active building permits, there is potential (or an expectation) for two more fire hydrant variance requests to Council. In addition to the active building permits, there have been three recent preliminary development proposals northwest of the subject property. If any of these proposed development plans proceed, each proposed development would trigger a minimum of two to four hydrants per development to be installed.

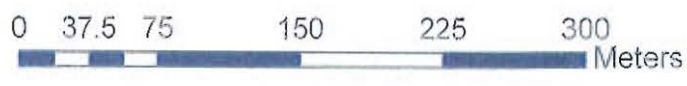
CONCLUSION

Although the Fire Department comments indicate no potential problem with fighting a fire on the subject property using the existing nearby hydrants, the engineering report strongly recommends that the requirement to waive the installation of a fire hydrant be denied.

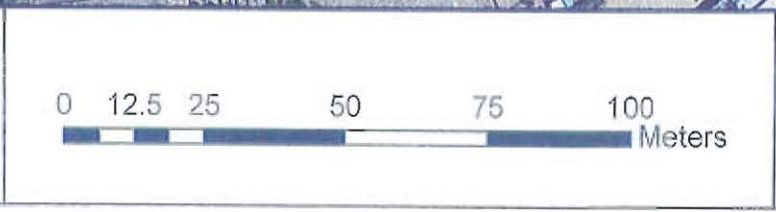
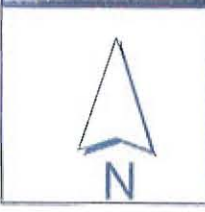
Considering the potential for future development in the industrial park, the City's ongoing participation in the Fire Underwriters Survey (which has an impact on insurance rates) and, the servicing level requirements of the Subdivision & Development Servicing Bylaw No. 4163, it is recommended Council deny this variance request.



Denise Ackerman
Planner, Development Services Department


Kevin Pearson, MCIP, RPP
Director of Development Services



 Subject Parcel



 Subject Parcel

To the Council of the City of Salmon Arm

April 30, 2019

I am writing this letter to ask for a variance regarding Subdivision and Development Services Bylaw No. 4163 that requires fire hydrants to be spaced at 90 meters apart within the Industrial Zone. I am being required by the city to do upgrading along Auto road by installing an additional fire hydrant on my frontage due to my application to put up a 42' x 56' portable fabric building on my property at 5731 Auto road SE. Along my Auto road frontage the existing fire hydrants are approx. 120 meters apart.

Description of my business,

I am the owner/operator of T-1 Enterprises in Salmon Arm located at 5731 Auto rd. SE which is a small company I started through community futures in 2008. We contract steel fabrication services to the local sawmill engineering companies also located in the Salmon Arm Industrial park. My business currently has two fulltime employees who are local, and I also work with the school district and Industry Training Authority (ITA) by providing skills training and employment opportunities to students.

To stay competitive in this industry it became apparent my company needed to move into a new location in 2014 to allow us to safely handle and fabricate bigger equipment to meet client needs. I purchased the land and building at this location (5731 auto road SE) in 2014 and cleaned up the property over the past few years which I think has reflected very positively on the surrounding businesses in the Salmon Arm industrial park.

In January of this year I decided to purchase a fabric building to store raw steel materials and partially completed work in a secure area protected from the weather to free up space in the small fabrication shop. There have been a lot of thefts in the surrounding area, so this building gives me the option to extend my security system to monitor unauthorized entry of the enclosed building.

Before purchasing the fabric building, I researched my options and worked with city staff on how best to go about this project in a timely, cost effective manner. In doing so I also contracted a local company, who has previously worked with the city building department, to supply and erect the building turn key. This contractor has supplied and erected new fabric buildings in various location throughout the Salmon Arm industrial park and was very knowledgeable of the building requirements. I felt assured this building would conform with all city requirements and bylaws as my contractor put up a very similar fabric building across the street from me in July of 2018 for Talus (46 Ave SE # 5501). To my knowledge they were not required to do any upgrading to the fire hydrants spaced at 120 meters along it frontages on Auto road and 155 meters on 46 Ave SE.

I applied for a building permit Feb 12, 2019. As requested by the city I had my property surveyed, provided a professional architect report on a fire risk assessment on the building structure and supplied all engineering documentation conforming to the most recent building codes (schedule B). All these steps were communicated to me as a requirement in my Jan 2019 inquiry with the city which led me to believe I was in full compliance with the city to obtain a building permit.

On March 12, 2019 I received an email from the city informing me I was now required to install a new fire hydrant along my Auto road frontage as there was a bylaw passed in 2016 that changed the existing fire hydrant spacing to 90 meters apart. Cost estimate for a fire hydrant as per email was is \$16,587.50, including a 25% contingency.

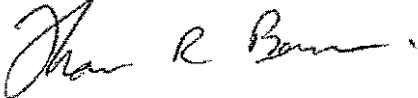
The existing two fire hydrants along my frontage are approx. 120 meters apart with one located at each end of my property. On the north west side of my frontage the existing fire hydrant that is directly across Auto road from my shop is approx. 50 meters to the corner of my main building's concrete foundation. From the center of Auto road to my property line it is approx. 11 meters away in a direct straight line to the main shop. A new fire hydrant between the 2 existing ones along my frontage would put the spacing at approx. 60 meters apart and the new one would be further away from my building than the existing one across the street.

With a new fire hydrant installed on my frontage along Auto road, along with another new hydrant Dino Flex across the street is being requested to install on 48th Ave SE, would bring the number of fire hydrants to six in a 120 meter radius from the "new" fire hydrant location along Auto road. At present time there are four fire hydrants on the city map in this radius.

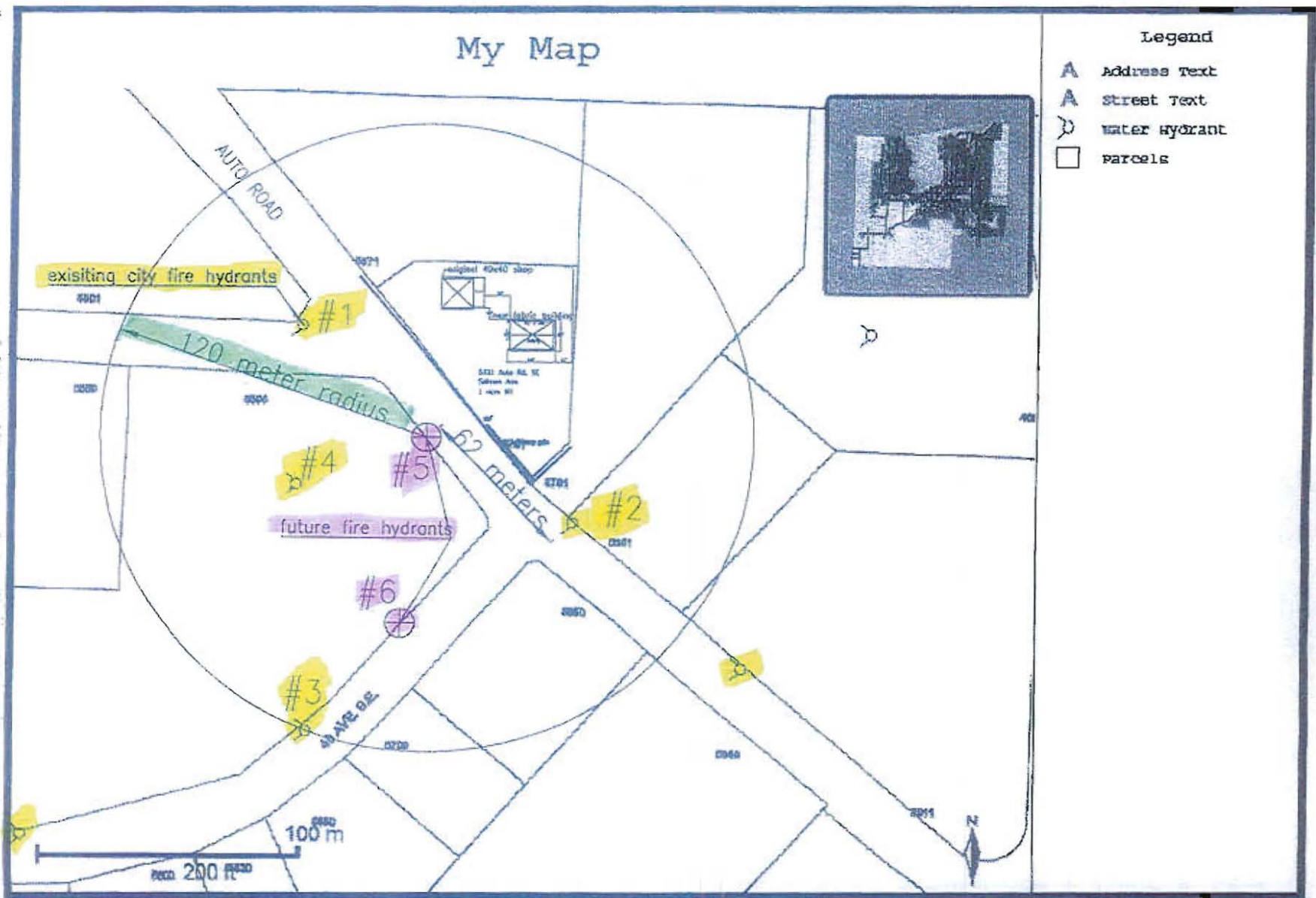
I am asking city council for a variance to forgo the requirement of an additional fire hydrant along my Auto road frontage. I have submitted a drawing using the city's online mapping tool to clearly show the existing fire hydrants around my property. The costs associated to have three fire hydrants 60 meters apart on my frontage is quite significant for a small business to absorb.

Thank you for your time and consideration to review this variance request.

Tom Boman



owner/operator



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5590 – 46th Ave S.E. P.O. Box 3309
 Salmon Arm, British Columbia
 Canada V1E 4S1
www.dinoflex.com
 P 250 832-7780 F 250 832-7788

June 21, 2019

Dear Mayor and Councillors of the City of Salmon Arm:

This letter is to request a variance regarding Bylaw No. 4163 that requires fire hydrants to be at a minimum distance of 90 metres apart. Dinoflex is responsible to fund the installation of 1.5 hydrants under this bylaw, 50% of the addition of hydrant along Auto Road, and 100% of the addition of a hydrant on 48th Ave. These were required by the city as part of our building permit for an addition to our existing manufacturing facility at 5590 46th Ave SE in the Industrial park of Salmon Arm. T1 Enterprises is responsible for the remaining 50% of the hydrant along Auto Road for his application for a portable fabric building at 5731 Auto Road SE.

Dinoflex currently employs 44 people at our facility in the Salmon Arm industrial park. We have been a leading innovator in the manufacture of recycled rubber products for over 30 years, specializing in producing premium quality rubber flooring, surfaces, tiles and custom products. Our merchandise provides solutions for architects, designers, and builders across the globe that are cost effective and environmentally friendly. Our unique process produces an impressive range of richly colored flooring suitable for a multitude of sport and commercial applications.

A second component of our business in Salmon Arm operates as International Polyurethane Solutions (IPS) and has been a long-standing innovator in the production of polyurethane and polyurea products for over two decades. IPS specializes in premium quality binder, casting resin, spray coatings, and foam products and are sold throughout North America.

Our IPS production, warehouses, and racking are all equipped with engineered sprinkler systems.

There are four existing fire hydrants on the peripheral of our property. In addition to these four hydrants, we have a certified hydrant directly in the centre of our property. This hydrant is professionally certified each year and all proper connections supplied. This hydrant is also kept accessible all year round. The fire department has a key to the property for easy access during non-business hours via a key box at the gate.

We believe that the current configuration of five hydrants satisfies what we interpret is the intent of Bylaw No. 4163 - which is to provide reasonable redundancy of fire hydrants for fire services in the event of an emergency. The additional two hydrants proposed creates needless redundancy in our view – which would lead to higher and unnecessary maintenance and service costs for the city in future years.



"We believe when we help our customers succeed, we succeed."

The location of the fire hydrant on 48th Avenue is near a dirt parking lot – with no proximity to structures. We also noticed that 48th Avenue was recently paved and it would be unnecessary for the city to now proceed with excavation for a water line on this newly paved road.

We ask the council to approve our variance request of not being required to install the fire hydrant on the Auto Road frontage and the fire hydrant on the 48th frontage.

Mark Bunz, CEO

Dinoflex Group LP

Mark Bunz for Mark Bunz



"We believe when we help our customers succeed, we succeed."



T-1 Enterprises, new fabric structure shown on the right



Facing northwest, showing hydrant along 48 Avenue SE with Dinoflex in the background



Facing southeast, showing the hydrant on Auto Road SE, southeast of the subject properties

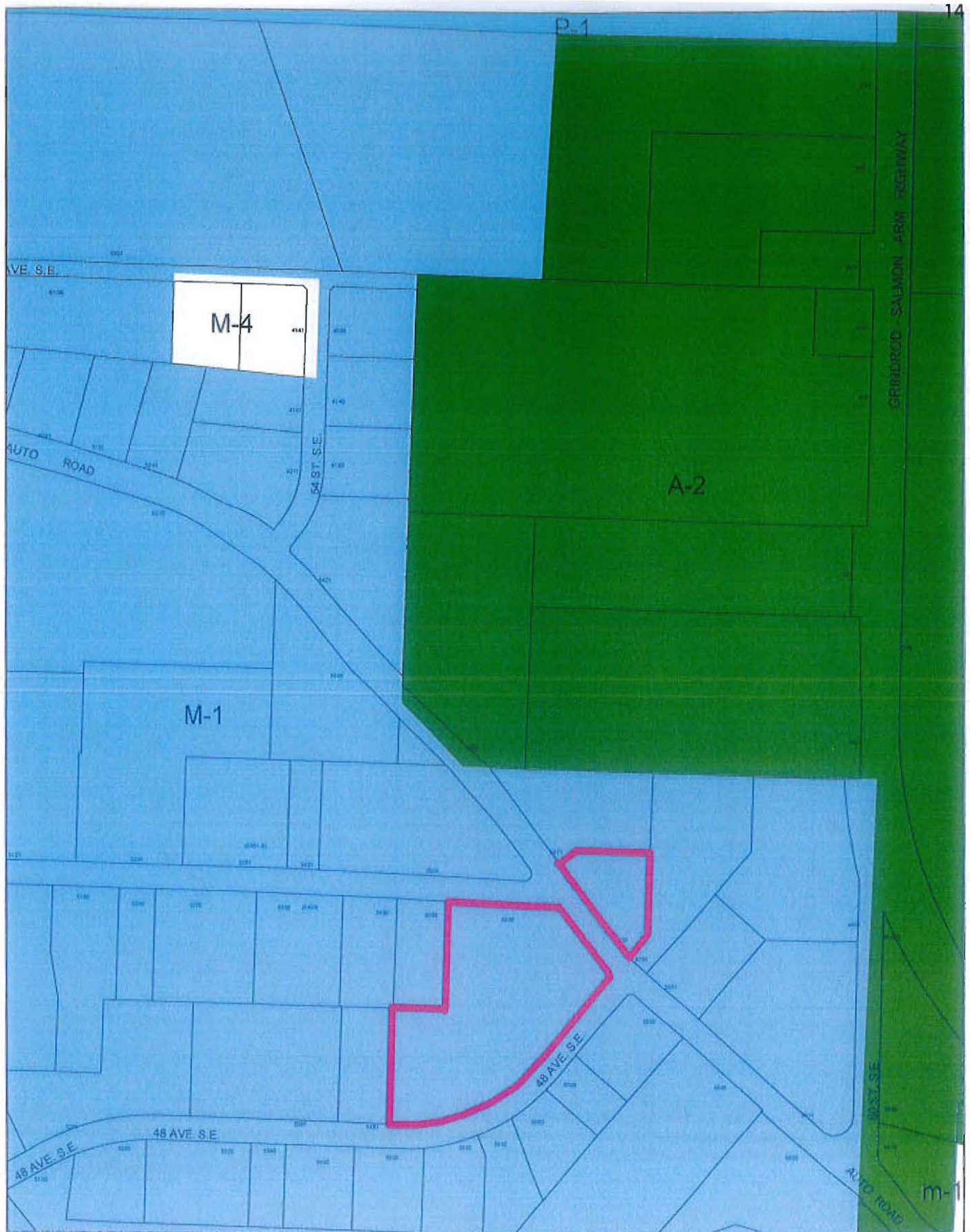








Facing east towards T-1 Enterprises, showing the fire hydrant at the intersection of 46 Avenue & Auto Road SE



- Acreage Reserve
- Industrial - General
- Industrial - Airside

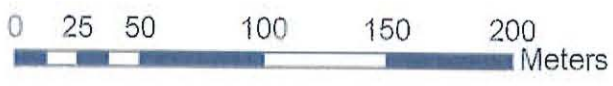







		 M-1 General Industrial Zone	 Subject Parcel
		 A-2 Rural Holding Zone	
		 M-4 Abattoir Zone	



45 m. Radius From Hydrant



-  Subject Parcel
-  Required Hydrant
-  Existing Hydrant

[Submit Form](#)
[Print](#)


DEVELOPMENT SERVICES DEPARTMENT
 Box 40, 500 - 2nd Avenue NE, Salmon Arm, BC, V1E 4N2
 Phone: 250-803-4021 FAX: 250-803-4041

TO:

DIRECTOR OF DEVELOPMENT SERVICES (Kevin)
 PLANNING AND DEVELOPMENT OFFICER (Scott)
 PLANNING AND DEVELOPMENT OFFICER (Chris)
 PLANNING AND DEVELOPMENT OFFICER (Denise)
 MANAGER OF PERMITS & LICENSING (Maurice)
 FIRE DEPARTMENT (Brad)
 ENGINEERING & PUBLIC WORKS DEPARTMENT (Rob, Jenn & Shelly)
 BC HYDRO, via email utilities group
 FORTISBC, via email utilities group
 TELUS, via email utilities group
 SHAW CABLESYSTEMS, via email utilities group

REFERRAL:

DATE: May 03, 2019
OWNER: 0924020 BC Ltd, [Tom Boman] 3281 – 10 Avenue SE, Salmon Arm, BC V1E 1W8
APPLICANT / AGENT: n/a
SUBJECT: DEVELOPMENT VARIANCE PERMIT APPLICATION NO. VP- 499
LEGAL: Lot A, Section 5, Township 20, Range 9, W6M KDYD, Plan 28401
CIVIC: 5731 Auto Road SE
ASSOCIATED: n/a
PREVIOUS: n/a

Attached is an application and supporting documentation. The applicant is requesting a servicing variance to not install a fire hydrant.

Your comments are required A.S.A.P.

Thank you.

Kevin Pearson, MCIP, RPP
 Director of Development Services

COMMENTS for VP-499

Further to my visit to the business located at 5731 auto road S.E, my opinion is the fire department would have no problems in combatting a fire and establishing a sufficient water supply from fire hydrants located adjacent to this property.

SIGNATURE: Brad Shirley

DATE: May 27th, 2019

[Submit Form](#)[Print](#)

DEVELOPMENT SERVICES DEPARTMENT
 Box 40, 500 - 2nd Avenue NE, Salmon Arm, BC, V1E 4N2
 Phone: 250-803-4021 FAX: 250-803-4041

TO:

DIRECTOR OF DEVELOPMENT SERVICES (Kevin)
 PLANNING AND DEVELOPMENT OFFICER (Scott)
 PLANNING AND DEVELOPMENT OFFICER (Chris)
 PLANNING AND DEVELOPMENT OFFICER (Denise)
 MANAGER OF PERMITS & LICENSING (Maurice)
 FIRE DEPARTMENT (Brad)
 ENGINEERING & PUBLIC WORKS DEPARTMENT (Rob, Jenn & Shelly)
 BC HYDRO, via email-utilities-group
 FORTISBC, via email-utilities-group
 TELUS, via email-utilities-group
 SHAW-CABLESYSTEMS, via email-utilities-group

REFERRAL:

DATE: June 25, 2019
OWNER: 0924020 BC Ltd, [Tom Boman] 3281 – 10 Avenue SE, Salmon Arm, BC V1E 1W8
 Dinoflex Holdings Inc. 5590 – 46 Avenue SE, Salmon Arm, BC V1E 1X2
APPLICANT / AGENT: Owner(s)
SUBJECT: DEVELOPMENT VARIANCE PERMIT APPLICATION NO. VP- 499 Amended
LEGAL: Lot A, Section 5, Township 20, Range 9, W6M KDYD, Plan 28401
CIVIC: 5731 Auto Road SE
 5590 – 46 Avenue SE
ASSOCIATED: n/a
PREVIOUS: n/a

Attached is an application and supporting documentation. The applicant is requesting a servicing variance to not install a fire hydrant.

Your comments are required A.S.A.P.

Thank you.

Kevin Pearson, MCIP, RPP
 Director of Development Services

COMMENTS for VP-499 Amended

Do not disagree with the 90m spacing of fire hydrants however from a response perspective, there are sufficient hydrants adjacent to this property.

SIGNATURE: Brad Shirley

DATE: May 27th, 2019

CITY OF SALMON ARM

*Memorandum from the
Engineering and Public
Works Department*

TO: Kevin Pearson, Director of Development Services
 DATE: June 4, 2019
 PREPARED BY: Jenn Wilson, City Engineer
 OWNER: 0924020 BC Ltd. (Tom Boman), 3281 – 10 Avenue SE, Salmon Arm, BC V1E 1W8
 Dinoflex Holdings Inc. 5590 – 46 Avenue SE, Salmon Arm, BC V1E 1X2
 APPLICANT: Owner(s)
 SUBJECT: **DEVELOPMENT VARIANCE PERMIT APPLICATION NO. VP-499
 Amended**
 LEGAL: Lot A, Section 5, Township 20, Range 9, W6M KDYD, Plan 28401
 CIVIC: 5731 Auto Road SE
 5590 – 46 Avenue SE
 ASSOCIATED: BP 16016B
 PREVIOUS: N/A

Further to the request for variance dated May 3, 2019; the Engineering Department has reviewed the site and offers the following comments and recommendations relative to the requested variances:

1. Waive the requirement to install a fire hydrant.

Subdivisions and Developments are required to complete frontage improvements to meet the service levels required in the Subdivision and Development Services Bylaw 4163 (SDSB) unless they fall under one of several exemptions.

Industrial properties are exempt from frontage improvements if the footprint of expansion is equal to or lesser than 50m². This exemption was changed from the previous SDSB which had a value based exemption of up to \$150,000 because this resulted in many developers artificially lowering their building permit values in order to fall under the exemption. These building permit applications have a value of \$43,998 for 5731 Auto Road SE and \$500,000 for 5590 – 46 Avenue SE and do not fall under any current exemptions.

The SDSB states that fire hydrant spacing shall be approximately, and in all cases shall not exceed 150 meters in low density residential zones and 90 meters in medium and high density residential zones, commercial, industrial and institutional (IC) zones and 300 meters in ALR/Rural zones. Please refer to the attached map showing the hydrant coverage deficiencies. The hydrant installation is the only frontage improvement that either property is subject to through the SDSB. It is the City's understanding that the applicants intend to split the cost of the hydrant installation on Auto Road 50-50% should the variance application fail.

DEVELOPMENT VARIANCE PERMIT APPLICATION NO. VP-497

Page 2

Fire Hydrant spacing recommendations are provided by the Fire Underwriters Survey (formerly the Insurers' Advisory Organization and Canadian Underwriters Association), a national organization that provides data on public fire protection for fire insurance statistical work and underwriting purposes of subscribing insurance companies. Specifically, the Water Supply for Public Fire Protection (Fire Underwriters Survey – A service to insurers and municipalities, 1999) states:

"The maximum recommended spacing of hydrants in commercial, industrial, institutional and multi-family residential areas is 90 meters; in single family residential areas 180 metres is recommended."

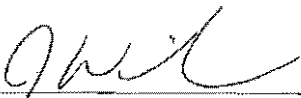
Staff reviewed over 25 other municipalities and found that the City of Salmon Arm's bylaw is very consistent with municipalities throughout BC and Canada.

We note that the cost of hydrant installation in ICI & high density areas can be quite high due to the size of the water mains (a significant portion of the cost is the hot-tap into the watermain). We also note that **the estimate that has been given to the applicants has significant contingency values added and it would be expected that the applicant will pay 75% of the estimate or less if no issues are encountered during installation.**

Recommendation:

The Engineering Department strongly recommends that the requirement to waive the installation of a fire hydrant be denied. Setting a precedent of waiving safety related requirements against the recommendation of FUS would likely cause liability issues for the City and creates a grey area for applicants on City requirements.

Although Engineering would not support such an initiative, if the hydrant spacing in the ICI & high density residential areas is deemed too onerous by Council the inherent risks of reduced coverage should be explored and the service level (SDSB hydrant spacing requirements) should be decreased to create a known requirement for applicants.



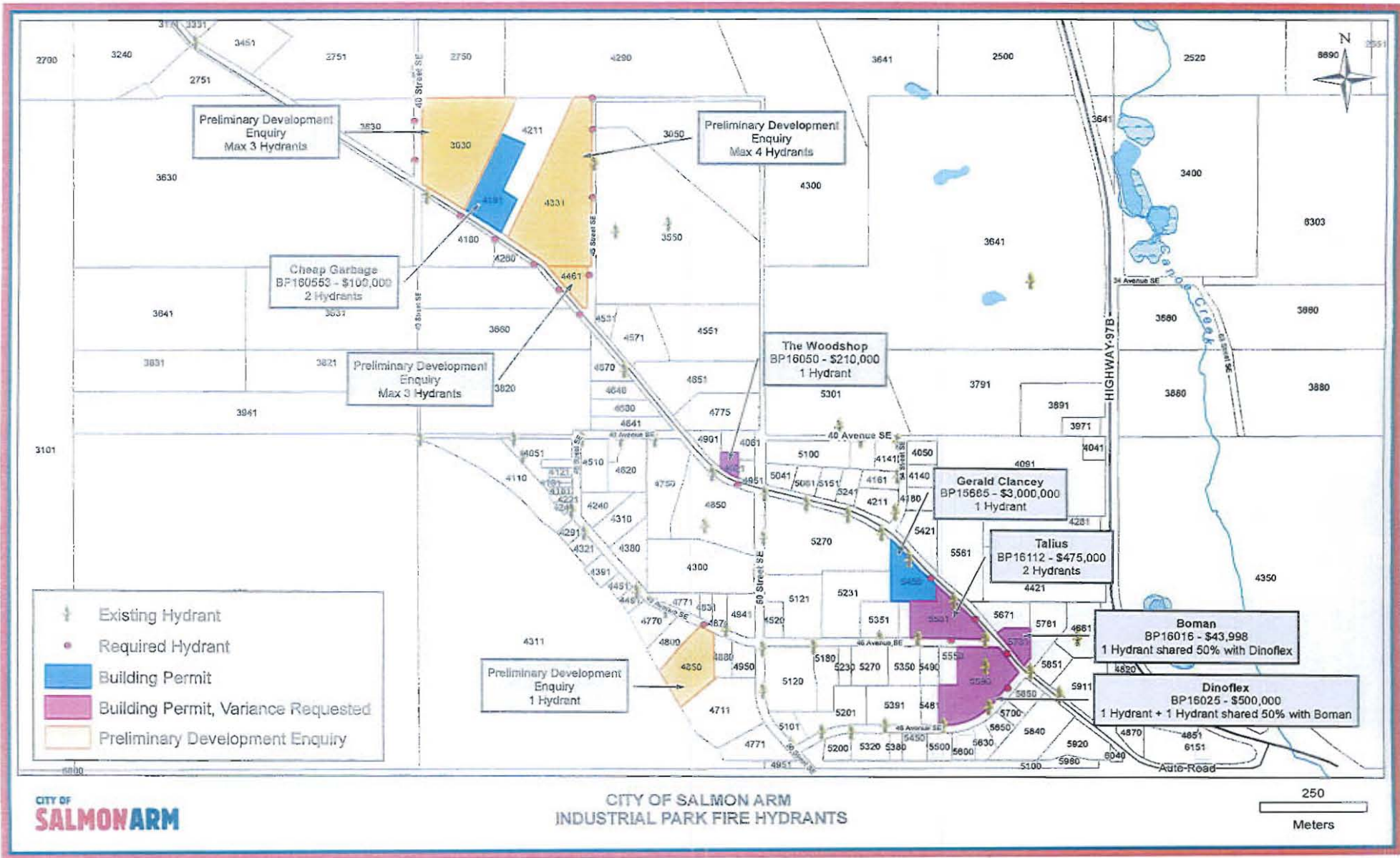
Jenn Wilson
City Engineer

APPENDIX 10: Table 1 - Service Levels For Subdivision & Development

TABLE 1: Service Levels for Subdivision and Development (1)

SERVICE	SERVICE LEVEL	DEVELOPMENT AREA						
		Urban	Rural	Industrial	Light Industrial	City Centre	Urban Hillside	Rural Hillside
Highways: Road Standards, including curb, gutter, paving, etc. shown on applicable specification drawing. Collector and Arterial Road Standards shall be applied where designated in the <i>Official Community Plan</i>	RD-1 - Urban Local (18m)	X					X	
	RD-2 - Urban Local (20m)	X					X	
	RD-3 - Urban Collector (20m)	X					X	
	RD-4 - Urban Arterial (25m)	X (7)					X (7)	
	RD-5 - Town Centre (Varies)	X				X		
	RD-6a - Industrial Area (20m)			X				
	RD-6b - Light Industrial (20m)				X			
	RD-7 - Rural Local (20m)		X					X
	RD-8 - Rural Collector (20m)		X	X				X
	RD-9 - Rural Arterial (25m)		X (7)	X (7)				X (7)
	RD-14 - Canoe Beach Drive (20m)	X						
	RD-15 - Urban Local Hillside (18m)						X	
	RD-16 - Rural Local Hillside (18m)							X
Road dedication	Based on applicable road cross-section (2)	X	X	X	X	X	X	X
Water	City Water System including fire hydrants	X	(8)	X	X	X	X	(8)
	Alternate Water Supply		X (6)					X (6)
Sanitary	City Sewer System	X		X (3)	X (3)	X	X	
	Sewage Disposal to Ground System		X	X	X			X
Storm	City Storm Sewer System	X		X	X	X	X	
	Open Channel System	X (10)	X	X	X		X (10)	X
	Ground Discharge	X (10)	X	X	X		X (10)	X
Hydro, Telecommunications (Civil Works Required)	Overhead Distribution to Property Line	(4)	X	X	X		(4)	X
	Underground Distribution to Property Line	X (5)				X (5)	X (5)	
	Overhead Service (within lot)	(4)	X	X	X		(4)	X
	Underground Service (within lot)	X				X	X	
Natural Gas (Optional)	Underground	X	X	X	X	X	X	X
Street Lighting	Schedule B, Part 1, Section 8.0	X	(9)	X	X	X	X	(9)
Sidewalk	One Side (Lined Local)	X		X	X		X	
	Two Sides (Collector/Arterial or Medium to High Density Development)	X				X	X	
Street Tree & Boulevard Furnishings & Planting	Street Trees/Park Benches/Planters					X		
Trail and Roadside Corridors	CGS-7 to CGS-12	X	X	X	X	X	X	X

- 1 The applicable service level is indicated with an X.
- 2 Road dedication is capped at a 20 metre wide right-of-way and is not required for *Development*.
- 3 Required where the *City* system is within 100 metres and a gravity connection is possible.
- 4 Small *Subdivisions* and *Developments* do not require underground distribution where they are in an area of existing overhead distribution and the *City Engineer* in consultation with *BC Hydro* approves overhead works.
- 5 Three-phase *BC Hydro* distribution to be located underground only where a tri-party cost sharing agreement is in place between the *Owner/Developer*, *BC Hydro* and the *City*.
- 6 The *Owner/Developer* is required to grant a potable water treatment covenant in a form acceptable to the *Approving Officer*.
- 7 The *Owner/Developer* is to construct adjacent arterial road *Frontage* with one traffic lane (second lane funded by *City* if required).
- 8 Extension of municipal system into the rural area is permitted where supported by the *OCP*.
- 9 If street lighting is required for safety purposes. Rural Street lighting covered under Policy 5.5.
- 10 With specific approval from the *City Engineer* as part of an integrated stormwater management plan. *Owner/Developer* may be required to grant an Alternative Stormwater maintenance covenant in a form acceptable to the *Approving Officer* and the *Director of Development Services*.



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CITY OF SALMON ARM

TO: His Worship Mayor Harrison and Members of Council

FROM: Director of Development Services

DATE: July 25, 2019

SUBJECT: Development Variance Permit Application No. VP-500
 Legal: Lot 17, Section 25, Township 20, Range 10, W6M, KDYD, Plan EPP90378
 Civic Address: 4340 – 20 Street NE
 Owner /Applicant: W. & S. Cowan
 Agent: G. Arsenault

MOTION FOR CONSIDERATION

THAT: Development Variance Permit No. VP-500 be authorized for issuance for Lot 17, Section 25, Township 20, Range 10, W6M, KDYD, Plan EPP90378, which will vary Zoning Bylaw No. 2303 as follows:

Section 4.12.1 (a) Fences and Retaining Walls - increase the maximum permitted height of a retaining wall from 2.0 m (6.5 ft) to 4.9 m (16 ft).

STAFF RECOMMENDATION

THAT: The motion for consideration be adopted.

PROPOSAL

The subject property is located at 4340 – 20 Street NE which is located in the Green Emerald Estates subdivision (Appendix 1 & 2). The proposal is to build a rock retaining wall along the west property line at the rear of the house (Appendix 3). The applicant is requesting a variance to increase the maximum permitted height of a retaining wall from 2.0 m (6.5 ft) to 4.9 m (16 ft) as per the elevation plan provided by the applicant (Appendix 4). Site photos are attached as Appendix 5

BACKGROUND

The subject property is designated Low Density Residential in the City's Official Community Plan (OCP) and zoned R-7, Large Lot Single Family Residential Zone in the City's Zoning Bylaw (Appendix 6 & 7). It is noted on the site and elevation plans, the wall is encroaching on the property to the west. This property to the west is still owned by the developer. For access and maintenance purposes, it has been suggested to the developer that an easement be registered.

The lots along 20 Street NE naturally slope up to the east from 20th Street. The subject property is a panhandle lot off of 20 Street and a retaining wall is required to stabilize the slope from the west to the east, between the two lots. The retaining walls will be constructed with native large rock from the site. There will be two walls, each with a height of 2.4 m (8 ft). The walls will be setback 1.2 m (4 ft) from each other. Both walls exceed the maximum permitted height of a retaining wall in a rear and interior side yard of 2.0 m (6.5 ft). A building permit has been issued for the first 2.0 m (6.5 ft) section of the wall closest to the property line (as shown in Appendix 5, site photos).

STAFF COMMENTS

Fire Department

No Fire Department Concerns.

Building Department

Wall will be designed and reviewed by a registered professional. A building permit is in place for the initial section of the wall which does not exceed 2 metres in height.

Engineering Department

No Engineering Concerns.

Planning Department

The applicant is requesting a variance to Section 4.12.1 of the Zoning Bylaw. The Zoning Bylaw permits a maximum height of 2.0 m (6.5 ft) for a retaining wall in all rear and interior side yards in residential zones.

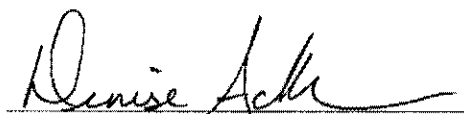
In this situation, the applicant is requesting a variance from the maximum height of 2.0 m (6.5 ft) to 4.9 m (16 ft) to allow for a level swimming pool in the rear yard. Each wall will have a height of 2.4 m (8 ft) and will be spaced 1.2 m (4 ft) apart. From a structural stability and building code perspective, the walls are considered one wall, with a total height of 4.9 m (16 ft). This is because the distance between the walls does not meet the 1:1.5 vertical to horizontal spacing ratio. To achieve this vertical to horizontal ratio, the distance between the walls would need to be 3.7 m (12 ft). However, a height variance would still be required with each wall being over 2.0 m (6.5 ft) in height. It should be noted that properties in Green Emerald Estates have a restrictive no build covenant stating no single family dwellings can be constructed within 15 m (49 ft) of the eastern parcel line. Because of this covenant, the rear yards are significantly reduced in size, making it difficult to off-set walls to achieve structural stability, while working within the confines of maximum permitted retaining wall heights.

As the natural slope of the property is from the west to the east, the retaining walls will commence along the north and south parcel lines and extend across the entire length of the west parcel line. As shown on the contour map on Appendix 8, the western portions of the panhandle lots significantly slope; thus, some form of a retaining wall will be required between the lots. The south adjacent lot (4270 – 20 Street NE) already has a new house and a retaining wall, built out of the same rock as with this proposal. Therefore, this retaining wall will fit in well with neighbouring properties and will provide stability to the slope between the lots to the west and east.

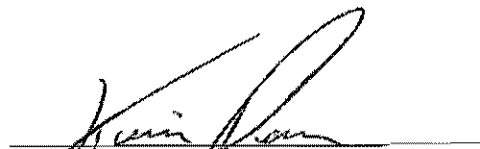
Due to the topography of Salmon Arm, there are many residential neighbourhoods built on steep slopes and construction of retaining walls is a common approach to creating level backyards in residential neighbourhoods such as this. Although OCP Policy 8.3.22 suggests minimizing cut, fill and retaining walls on hillside areas, as well as the preparation of grading plans prior to servicing and construction, this is the first retaining wall variance application for this neighbourhood and the neighbouring property to the south was able to achieve a level backyard, not going over the maximum permitted height of 2.0 m.

CONCLUSION

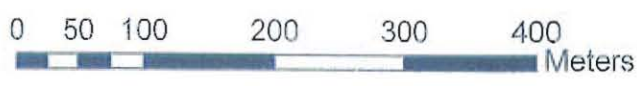
Although the applicant is asking for a significant height variance for the retaining walls, the walls will conform and fit in well with existing retaining walls on neighbouring properties. Staff feel that there are unique site specifics such as the topography and the restrictive no build covenant which justify this variance request.



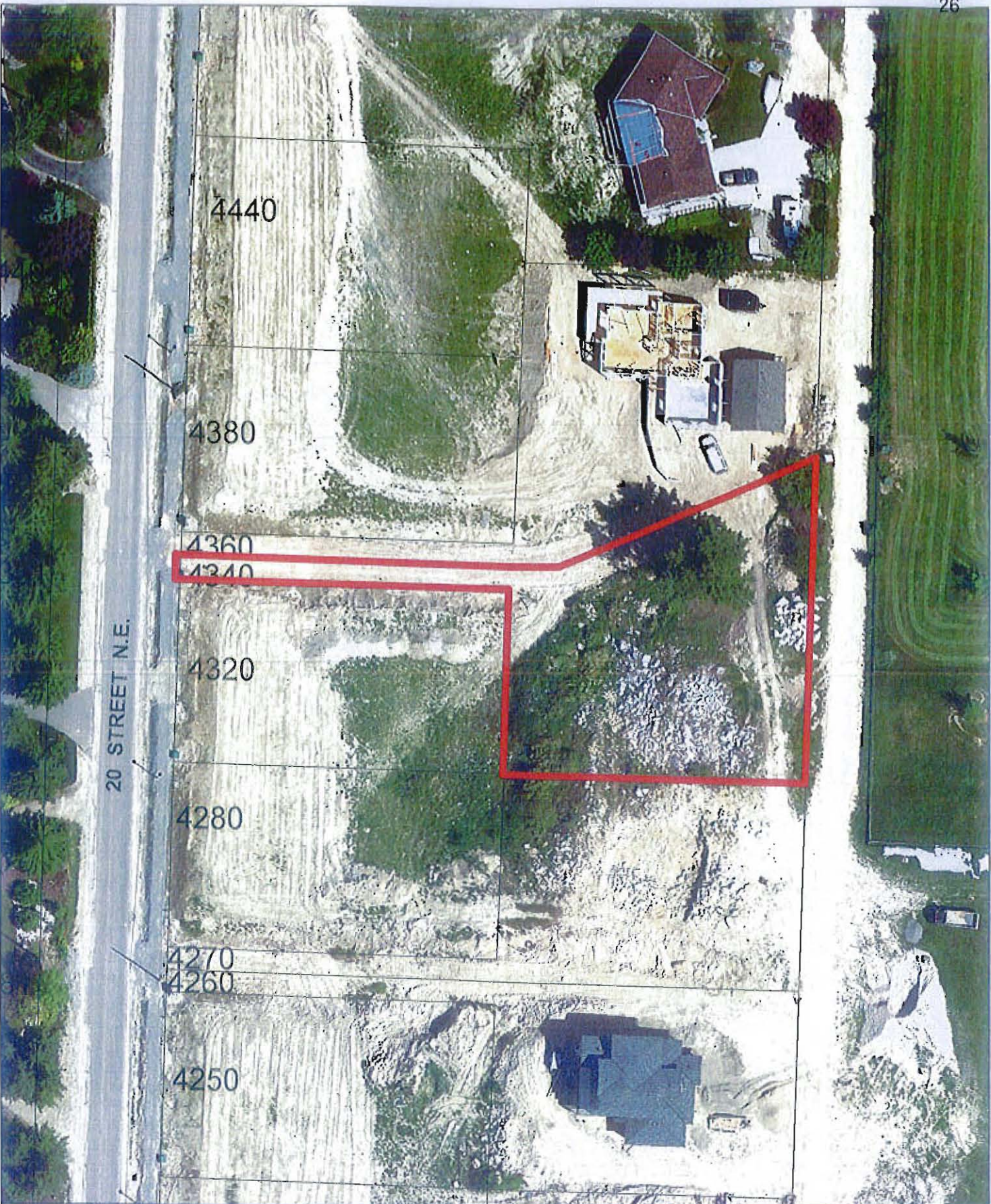
Denise Ackerman
Planner, Development Services Department



Kevin Pearson, MCIP, RPP
Director of Development Services



Subject Parcel



20 STREET N.E.

4440

4380

4360

4340

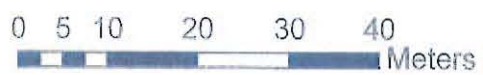
4320

4280

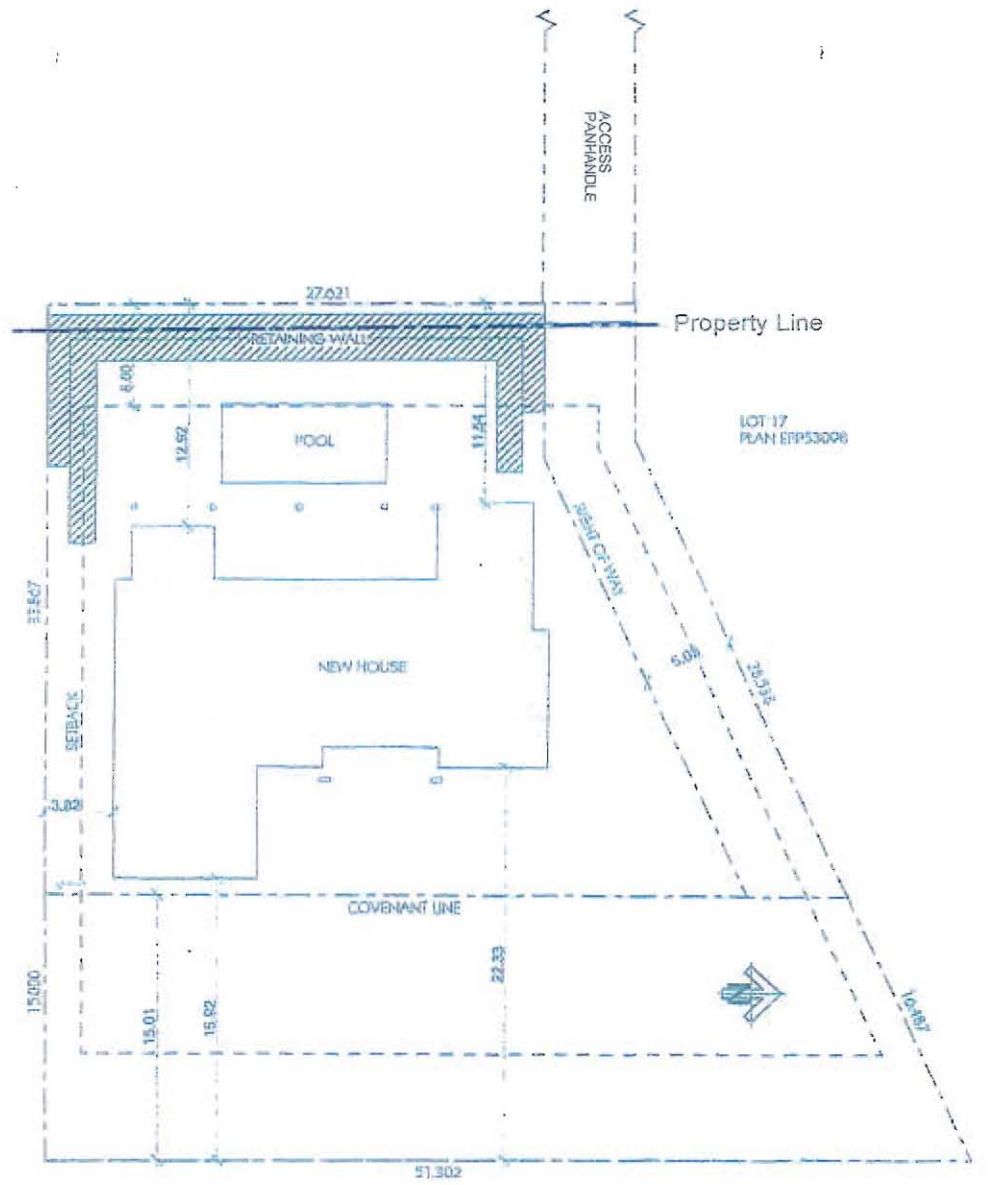
4270

4260

4250



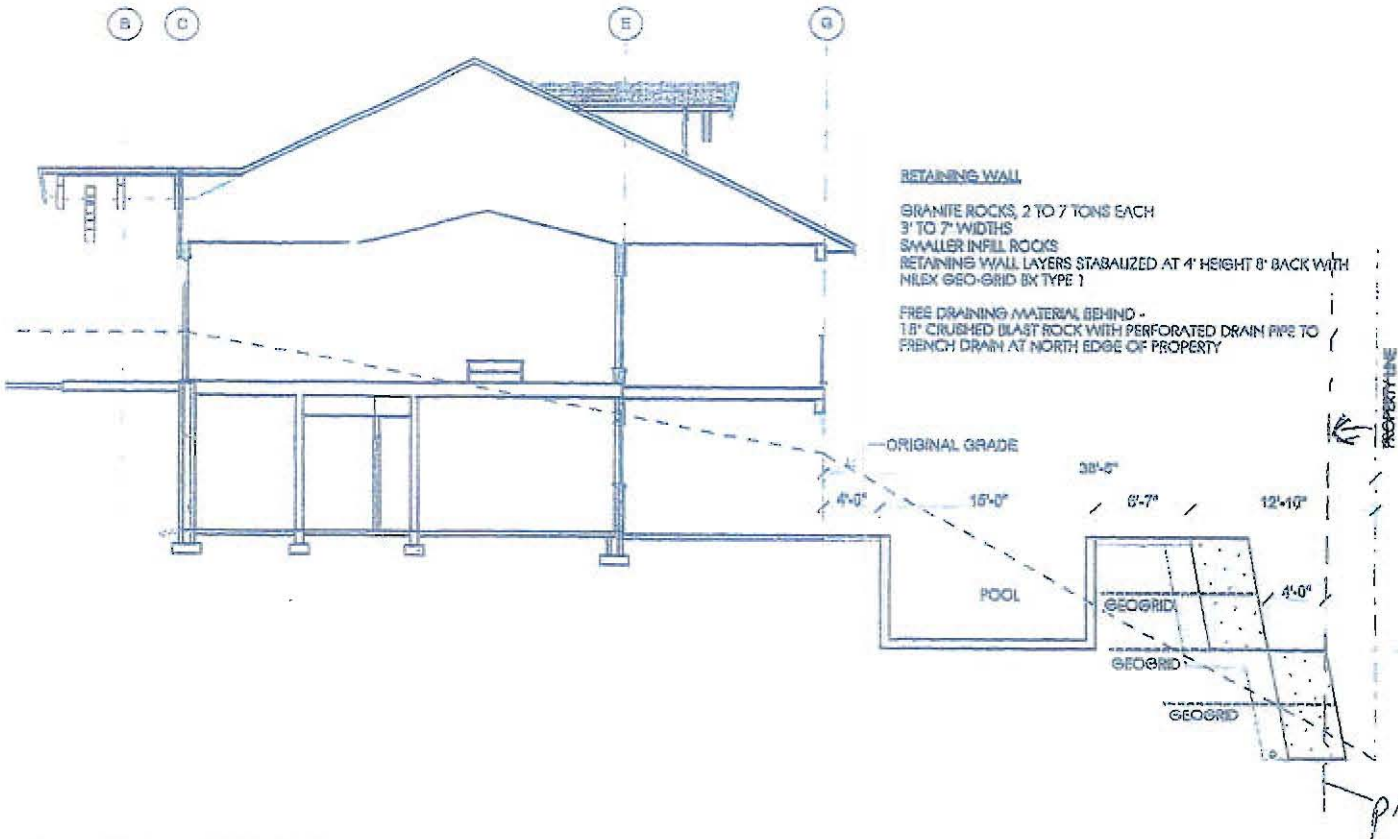
Subject Parcel



1 SITE PLAN RETAINING WALL
SCALE: 1:250


GREEN EMERALD
 CONSTRUCTION
 2100 45 AVE NE
 SALMON ARM, BC
 V1E 2A3
 TEL : (250) 833-5855
 FAX : (250) 833-5815
 office@greenemeraldinc.com
 www.greenemeraldinc.com

COWAN
RESIDENCE
 4/23/2019



**GREEN EMERALD
CONSTRUCTION**

2100 45 AVE NE
SALMON ARM, BC
V1E 2A3

TEL : (250) 833-5855
 FAX : (250) 833-5815
 office@greenemeraldinc.com
 www.greenemeraldinc.com

1 SITE SECTION
 SCALE: 1/8" = 1'-0"

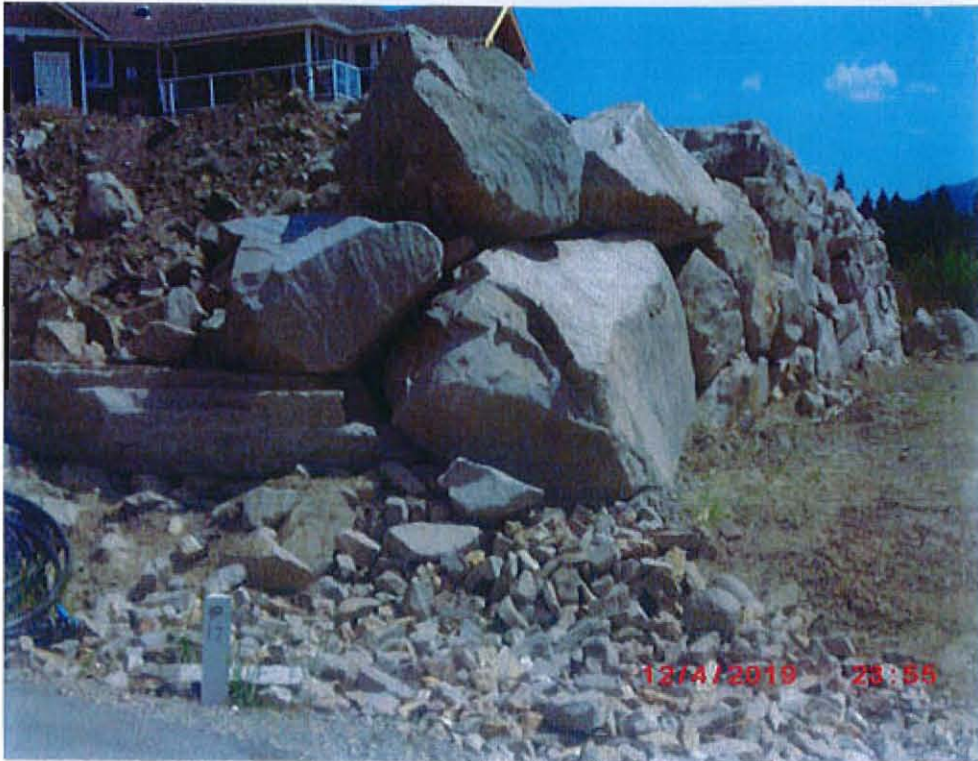
**COWAN
RESIDENCE**
 4/23/2019



View looking west towards 20th Street NE



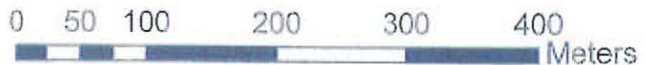
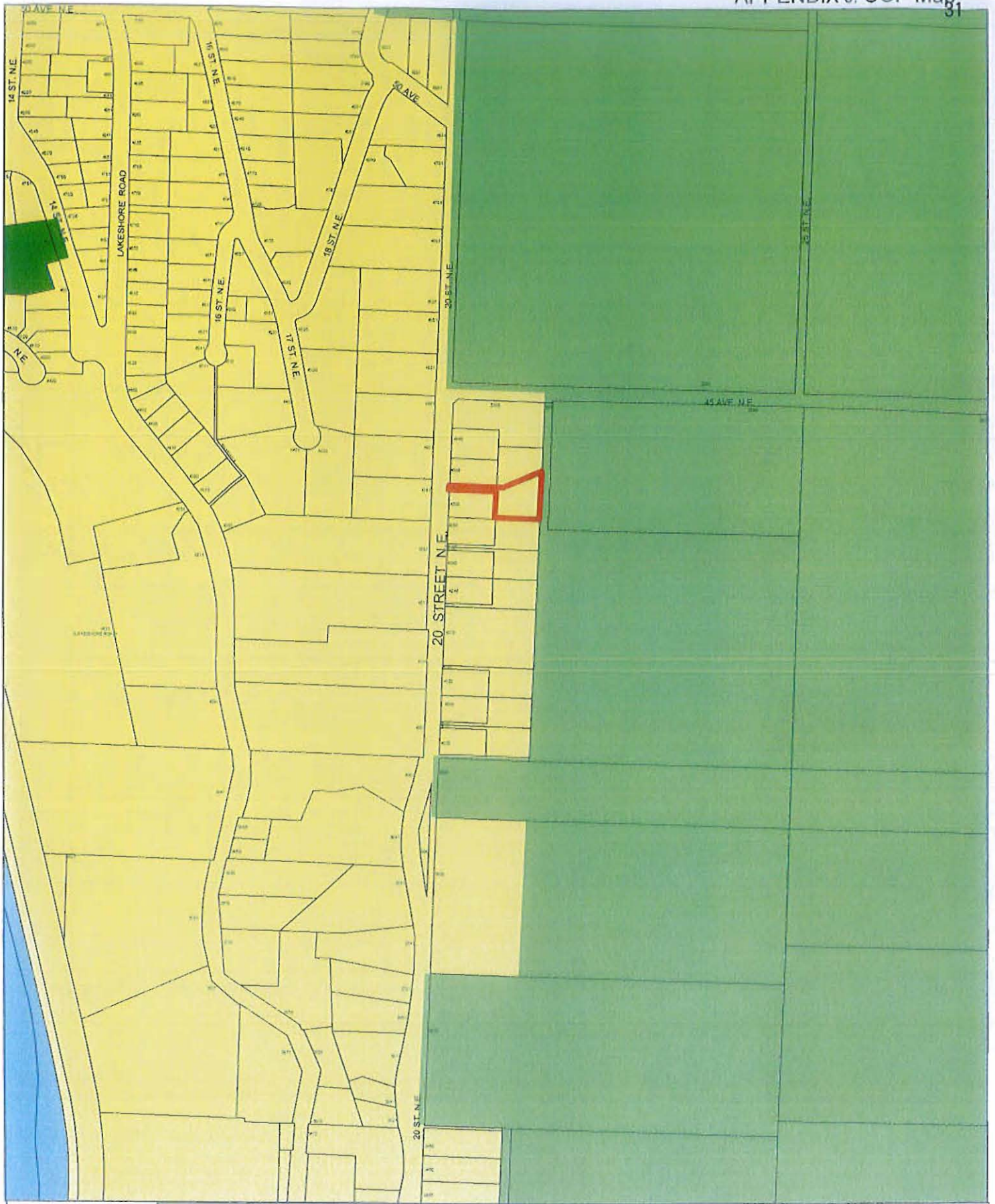
View looking southeast



View of retaining wall under construction along property line



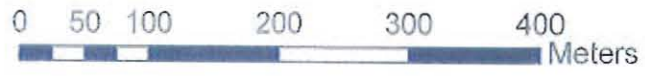
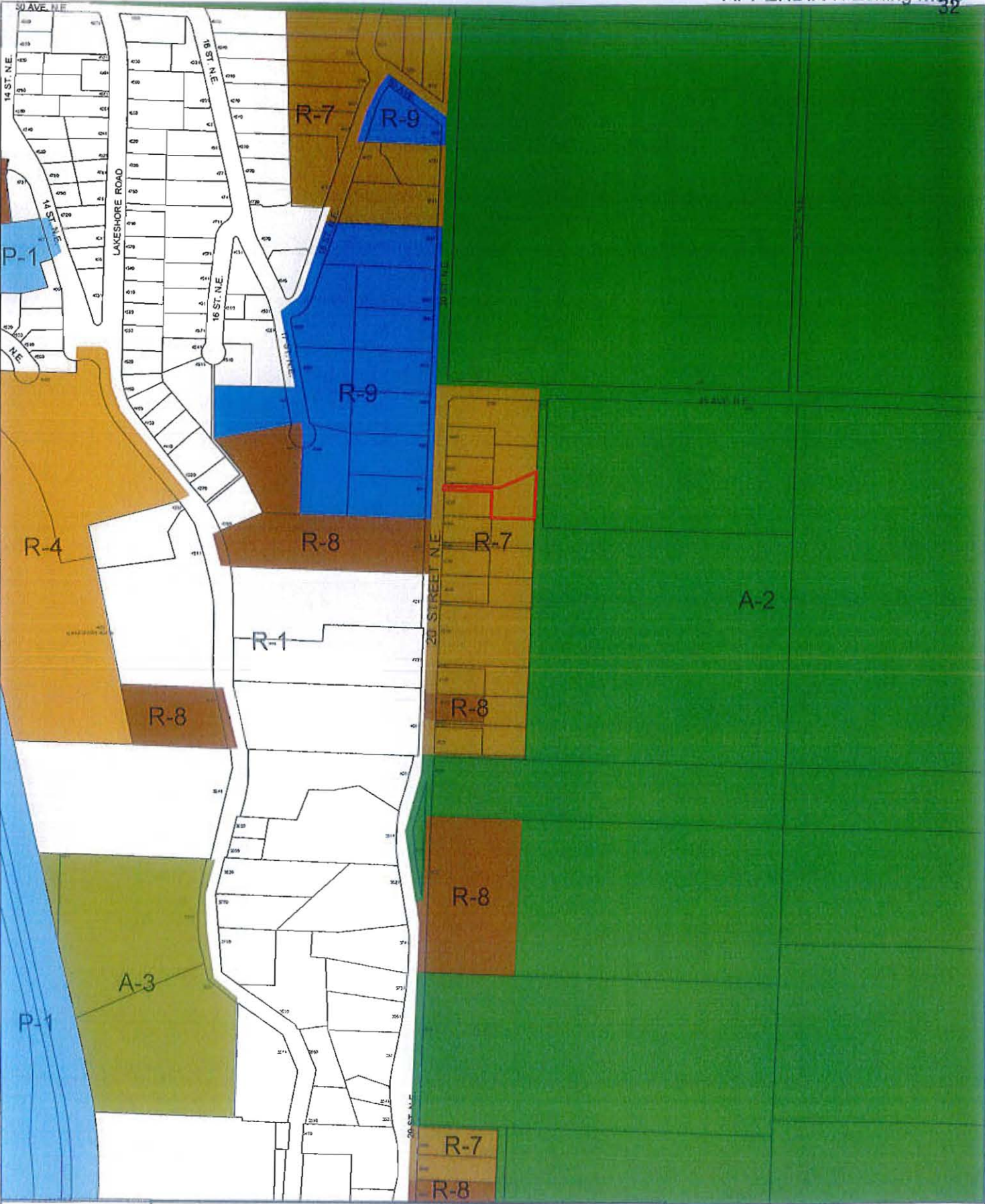
View of property to the south of the subject property



Subject Parcel

Acreage Reserve

Low Density Residential



 Subject Parcel

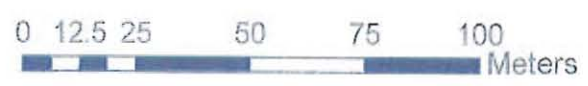


45 AVENUE N.E.

20 STREET N.E.

Parcel numbers along 20 Street N.E. (from top to bottom):

- 4440
- 4380
- 4360
- 4340
- 4320
- 4280
- 4270
- 4260
- 4250
- 4240
- 4230
- 4210
- 4140
- 4120
- 4080



Subject Parcel

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CITY OF SALMON ARM

To: His Worship Mayor Harrison and Members of Council
 From: Development Services Department
 Date: July 24, 2019
 Subject: Solar Feasibility Study

MOTION FOR CONSIDERATION

THAT: Council receive as information the report prepared by Riverside Energy Ltd.

BACKGROUND

At the January 28, 2019 Council Meeting City Council passed the following Resolution:

THAT: Council direct staff to engage a consultant and/or solar provider to evaluate the solar electricity potential for the following existing City buildings and/or properties:

- Salmon Arm Arts Centre (70 Hudson Avenue NE);
- City Hall (500 2 Avenue NE); and
- Fire Hall #3 (141 Ross Street NE);

AND THAT: the intent of the feasibility assessment be to make recommendations and provide a cost estimate for the design and installation of a potentially grid fed solar photovoltaic (PV) system, including structural assessment, the capital cost and projected annual operating and maintenance costs;

AND THAT: the project be funded to a maximum of \$5,000.00 from the Climate Action Reserve;

AND THAT: the 2019 Budget contained in the 2019 – 2023 Financial Plan Bylaw be amended to reflect a solar feasibility assessment in the amount of \$5,000.00 funded from the Climate Action Reserve.

The City issued a Request for Proposals to complete the feasibility assessment in February 2019 and Riverside Energy Ltd. was the successful proponent. The Riverside Energy Systems Solar PV Feasibility Review, dated July 8, 2019 (.PDF version), was distributed to City Council on July 26, 2019.

PROCESS

Riverside Energy Systems examined the feasibility of both a demonstration, 4 -10 kWp, and ultimate build out solar PV system at three locations. All three locations were said to have very good to excellent potential for solar PV performance. In all cases the existing electrical systems can accommodate demonstration systems with minor modifications. The assessment was completed within the parameters of the BC Hydro Net-Metering program.

Riverside Energy conducted solar photography and assessed the suitability of each site for ballasted racking installations. The results are summarized in the table on Page 2.

	City Hall	Fire Hall No. 3	Arts Centre
Demonstration	4 -10 kWp	4-10 kWp	4-10 kWp
Electricity Consumption Reduction	0.8% - 2%	13% - 33%	26% - 53%
Annual Savings (2019 Rates)	\$281 - \$703	\$583 - \$1,415	\$708-\$1,416
Installation Cost Estimate	\$10,600 - \$24,000	\$11,130 - \$24,480	\$13,260 - \$24,480
Ultimate Build Out	108 kWp	19.2 kWp	19.8 kWp
Electricity Consumption Reduction	22%	62%	Net Zero (100%)
Annual Savings (2019 Rates)	\$7,972	\$2,664	\$2,747
Installation Cost Estimate	\$221,400	\$45,120	\$62,880

Each site has its benefits and constraints. City Hall, being the newest building, has existing electrical system capacity and the most unobstructed roof area. Fire Hall No. 3 and the Arts Centre are limited in size, but could provide a better return on investment considering the BC Hydro rates. The Arts Centre may provide the best opportunity for demonstration and public engagement. The Arts Centre has been designated as a municipal heritage site since 1992 and a resolution by Council (at a minimum) would be required for any exterior alterations. The report also contemplates a patio shade structures or covered parking structures at City Hall or the Arts Centre which would be effective for demonstration purposes but capital costs would likely be higher.

A professional structural assessment would be required at the chosen location and the estimated costs could be between \$1,500 and \$3,500. The estimated ongoing annual maintenance include monitoring, cleaning and inspections is between 12 and 15 hours. The effective lifespan of the panels is typically 30 years, but they can last much longer. Other hardware replacement costs could be between \$2,500 and \$4,000 for a 4-10 kWp system over the effective lifespan. A careful assessment of the roof warranty would be required.

CONCLUSION

The Riverside Energy Ltd. report provides a clear concise description of the feasibility and costs involved for both a demonstration solar PV system that meets the required criteria of the RFP and a larger scale system. If Council wanted to proceed with a demonstration project they would need to budget for between \$12,500 and \$28,000 for capital costs plus the required annual maintenance with reserves for demonstration/public engagement and to replace components as required.

At present there are no funds specifically earmarked for this project.



Prepared by: Scott Beeching, MCIP, RPP
Senior Planner



Reviewed by: Kevin Pearson, MCIP, RPP
Director of Development Services



To: His Worship Mayor Harrison and Members of Council

Date: July 24, 2019

Subject: Body Gripping Animal Traps

FOR INFORMATION

At the May 22, 2019 Council Meeting City Council received a 22 page petition signed by supporters of Molly's Law, to ban snare traps within Salmon Arm City Limits by way of a bylaw. The petition was prompted by a family dog that was, unfortunately, ensnared and killed in a trap situated on private property and presumably meant for wildlife. A letter of support for the ban was also received from the Fur Bearers, a wildlife non-profit based in BC.

Staff reviewed a bylaw to regulate such traps that was adopted by the Town of Gibsons in 2011 after a similar incident (bylaw attached). Staff communicated with Gibsons Bylaw Enforcement Officer and was told that only one known bylaw infraction has occurred since it was adopted. Staff is unaware of other municipalities in the Province with a similar bylaw.

The Wildlife Act regulates trapping in the Province and is administered by the Ministry of Forests, Lands, Natural Resource Operations & Rural Development (regulations attached). A permit can be authorized to trap wildlife on your own property for the purpose of agriculture crop protection, to protect personal property from destructive wildlife, for educational purposes, for scientific study of wildlife and capture of wildlife for research or salvage. Licensed fur trappers can set their lines on Crown land with no requirement to give public notice. It is an offence to trap within 200 metres of a residence. There is no requirement to set traps back from public roadways or trails.

Local governments have "concurrent authority" with the Province, pursuant to the Community Charter, to adopt bylaws regulating the use of body gripping animal traps (neck snares, leg hold traps, etc.). Similar to the Plastic Bag Bylaw of the City requiring approval by the Ministry of Environment & Climate Change, a bylaw to regulate trapping practices would require approval by the Ministry of Forests, Lands, Natural Resource Operations & Rural Development. A local government bylaw could ban the use of body-gripping traps or require notice requirements on public land, but cannot contradict the authority of the Wildlife Act.

Conservation Officers are exempt from the Wildlife Act and Firearm Act when engaged in the performance of their duties and may deem it necessary to use body-gripping animal traps, which would also be exempt from a local government bylaw. Conservation Officers and licensed trappers prefer not to post signage; when the public is aware of the location, traps can be stolen or tampered with.

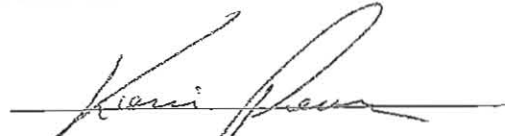
CONCLUSION

Staff does not recommend proceeding with the creation of a bylaw to regulate body-gripping animal traps. The responsibility of regulation and enforcement of animal trapping lies with the Ministry of Forests, Lands, Natural Resource Operations & Rural Development. Provincial Conservation Officers have the authority and expertise to manage the Wildlife Act and its regulations. A City bylaw would have no effect on legal trapping under the Wildlife Act; Conservation Officers and agricultural operators could continue to use body-gripping traps without posting notice.

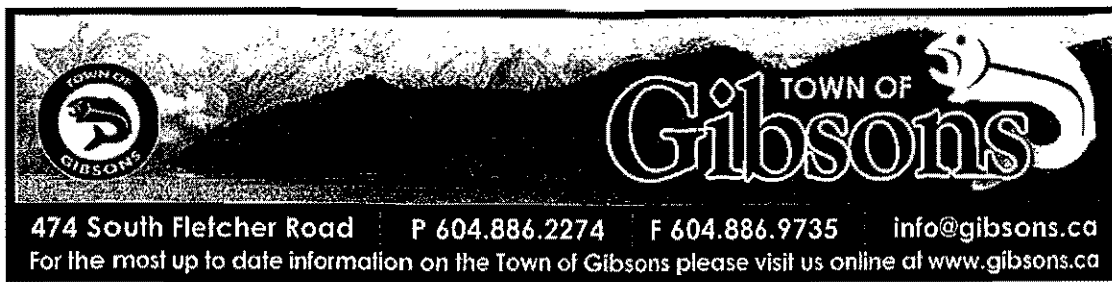
If the 200 m distance or other aspects of the Wildlife Act regulations are deemed to be insufficient, Council may want to lobby the Ministry responsible for a province-wide regulatory change.



Prepared by: Scott Beeching, MCIP, RPP
Senior Planner



Reviewed by: Kevin Pearson, MCIP, RPP
Director of Development Services



Gibsons, BC: August 2, 2011 – Gibsons Town Council has adopted the first bylaw in Canada to totally ban leghold, conibear and snare traps.

The Town of Gibsons Ban of Body Gripping Traps Bylaw No. 1147, 2011 was adopted August 2, 2011 after two separate major incidents where pets were caught and seriously injured in body gripping traps.

In the first incident a dog out for a walk with its owner in Sechelt got stuck in a leghold trap intended for wolves and had to be rescued by a Conservation Officer. The second incident at the end of June was a cat caught in a conibear trap in a residential area.

A delegation including, members of Concerned Citizens of the Sunshine Coast and the Association for the Protection of Fur-Bearing Animals proposed the bylaw to the Town of Gibsons, the District of Sechelt and the Sunshine Coast Regional District. Town Council pushed the bylaw forward with very little opposition.

Mayor Janyk stated:

- 30 -

The Town of Gibsons is a thriving community of 4,182 residents known as the "Gateway to the Sunshine Coast." Recently named the world's most liveable community in the United Nations-endorsed International Awards for Liveable Communities, Gibsons is spectacularly located on B.C.'s west coast and just a scenic 40-minute ferry trip from Horseshoe Bay in West Vancouver. For more information visit www.gibsons.ca.

Reference:

Warren Waycheshen
Chief Administrative Officer
Town of Gibsons
604-886-2274
paul.gipps@gibsons.ca

Barry Janyk
Mayor
Town of Gibsons
604-886-2274
bjanyk@gibsons.ca



TOWN OF GIBSONS
POLICY AND PROCEDURE MANUAL

SUBJECT: BODY GRIPPING TRAPS	SECTION: PARKS NUMBER: 6.8 PAGE 1 OF 1
ADOPTED: July 19th, 2011 REVISED:	RESOLUTION NO.:

A. Purpose

1. Conservation Officers are exempt from Trapping of Wildlife regulation under Section 86 of the Wildlife Act:
Officers exempted
86. The offence provisions of this Act and the regulations and section 9 of the Firearm Act do not apply to an officer engaged in the performance of his or her duties.
2. For Public Safety reasons Conservation Officers may deem it necessary to use "Body Gripping" traps for control of dangerous animals within the boundaries of the Town of Gibsons.
3. The Town of Gibsons Ban of Body Gripping Traps Bylaw No. 1147, 2011 states that:
No person shall use a body-gripping trap or device within the municipality.
4. The Provincial Wildlife Act will take priority over the Town of Gibsons bylaw in the event that the provincial employees deem it necessary for public safety to use "Body Gripping" traps.

B. Policy

In the event that Provincial regulations are imposed and Conservation Officers use "Body Gripping" traps they will be requested to:

1. Advise the Town of Gibsons Chief Administrative Officer or his designate the reason for, location and number of traps being used.
2. Post signage at trail entrances or public access areas to warn the public of the potential danger from the dangerous animal and the use of "Body Gripping" traps.
3. Once the animal has been captured or the "Body Gripping" traps have been removed the Conservation Officers will be asked for a brief report which will be submitted to Council for information purposes only.

C. Procedures

1. This policy will be referred to the local Conservation Officers and their cooperation solicited.
2. When Conservation Officers use "Body Gripping" traps they will be asked in writing to provide the information and the signage as noted above.

TRAPPING REGULATIONS

Major Regulation Changes for 2018-2020

1. Updated list of certified traps under the Agreement on International Humane Trapping Standards
2. Lengthened wolf trapping season on Vancouver Island
3. Revised wolf trapping seasons in the Kootenay Region
4. Shortened wolverine trapping season in the Kootenay Region

BC FUR MANAGEMENT PROGRAM

▶ In British Columbia, some 3,500 trappers actively manage 17 furbearing animal species, following standards, legislation and regulations developed by Ministry of Forests, Lands, Natural Resource Operations and Rural Development. About half of the province's trappers are Aboriginal.

▶ The Fur Management Program includes:

- The BC Trappers Association's (BCTA) Trapper Education Program courses for new and experienced trappers.
- The "Furbearer Management Guidelines" available for muskrat, beaver, mink, marten, fisher, weasel, wolverine, otter, bobcat, lynx, fox, coyote, and wolf. These guidelines outline the role that trappers can play in the wise management of these species. The guidelines can be found on the Wildlife and Habitat Branch website at: www.gov.bc.ca/hunting.

Regulating Harvest

▶ In general, appropriate trapping seasons have been developed by considering a variety of criteria including pelt primeness, relative vulnerability of age and sex classes to harvesting, abundance and capture technology.

▶ The registered trapline system continues to be the primary system for setting harvest guidelines and managing furbearing animals. Harvest levels are guided by species management strategies, with furbearers being divided into three classes: **Class 1 Species** - can be managed on individual traplines. This class includes beaver, fox, marten, mink, muskrat, raccoon, skunk, squirrel and weasel.

Class 2 Species - move between and among traplines and thus are not manageable on individual traplines. Harvests will be regulated regionally in consultation with local trappers. This class includes lynx, bobcat, wolverine, fisher and otter.

Class 3 Species - also move between

and among traplines, but generally are not vulnerable to over-trapping. This class includes the wolf and coyote. Trappers will be encouraged to trap these species, especially in areas of chronic animal damage control problems.

DEFINITIONS

egg trap - means a holding device set in a manner to capture a raccoon by a front paw.

foot snare - means a snare that is designed to capture the animal for which it is set by the foot or leg.

furbearing animal or furbearer - means any fox, beaver, marten, fisher, Canada lynx, bobcat, mink, muskrat, river otter, raccoon, skunk, squirrel (excluding ground squirrels), weasel, wolverine, wolf, coyote and black bear.

killing snare - means a snare that is designed to capture the animal for which it is set by the neck.

killing trap - means a trap or trapset that is designed to kill an animal.

leghold trap - means a trap or device, other than a snare, which is set in such a way as to capture the animal for which it is set by the leg or foot.

modified leghold trap - means a trap which has a minimum space of 5 mm between the jaws of the trap when in the closed position, or has manufactured pads of a rubber-like substance fastened to the trap jaws, or has lamination of the trap jaws to increase the surface area of the jaw face.

trapping - means the act of setting or placing a trap in an operative condition or killing by the use of a firearm.

and release it without a permit.

Use of Firearms

▶ It is an offence to trap wildlife using a firearm from one hour after sunset on any day until one hour before sunrise on the day following, unless using a firearm to kill a furbearing animal caught in a trap on a registered trapline.

Trapping Near A Dwelling Or On Private Property

▶ It is an offence to trap within 200 metres of a dwelling, unless you use:

If trapping on land, a live box trap or egg trap, or if trapping on or in water,

- a Conibear trap not larger than size #330 or equivalent, or
- leghold traps not larger than size #2, or
- submarine traps.

▶ It is an offence to trap on private property without a trapping licence and the written permission of the property owner:

Removal of Fur Bearer Hides

It is an offence to kill fur bearers and fail to remove either the hide or the edible portions to the person's normal dwelling place or to a meat cutter or the owner or operator of a cold storage plant. A person who kills wildlife is exempted from the requirement to remove the hide if that person transfers possession of the wildlife to another person who complies with the requirement.

GENERAL REGULATIONS & INFORMATION

Checking Traps

▶ A holder of a licence, permit or other authorization to trap commits an offence unless that person examines the holding or non-killing traps he or she has set on a trapline at least once every 72 hours, the egg trap(s) he or she has set for raccoons at least once every 24 hours, and killing traps or killing snares that he or she has set on the trapline at least once every 14 days.

▶ A holder of a licence, permit or other authorization to trap on private property commits an offence unless that person examines the holding or non-killing traps he or she has set on private property at least once every 24 hours.

▶ It is an offence to trap a furbearing animal, and if the animal is alive when the trap is checked, fail to immediately release or kill the animal.

▶ Except as authorized by regulation, it is an offence to trap a furbearing animal, and if the animal is alive, to transport it to another area



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Trapping
Supplies



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THE AGREEMENT ON INTERNATIONAL HUMANE TRAPPING STANDARDS

On June 1, 1999, the Agreement on International Humane Trapping Standards (AIHTS, or the "Agreement") came into effect. Signed by the Government of Canada, the European Community, and the Government of the Russian Federation, the Agreement serves to protect Canada's access to the European fur market and thus protects the wild fur industry in Canada.

The AIHTS sets performance thresholds on traps for specific species. Those traps that meet the performance thresholds are then eligible for certification.

In order to comply with the Agreement, BC has made numerous regulatory changes and will make further regulatory changes to ensure that only certified traps will be legal for those species listed in the AIHTS.

WHAT DOES THE AGREEMENT MEAN FOR BRITISH COLUMBIA'S TRAPPERS?

The Agreement applies to most furbearers trapped in B.C., including beaver, bobcat, coyote, ermine, fisher, lynx, marten, muskrat, otter, raccoon and wolf for the following purposes:

1. for wildlife management purposes, including wildlife conflict control;
2. to obtain furs, skins or meat;
3. for conservation purposes.

Since the 2007/2008 trapping season, a person using killing traps for beaver, fisher, marten, raccoon and muskrat and restraining traps for lynx has been required, by law, to use only species-specific traps included in BC's trapping regulations which have been certified under the Agreement. See page 94 for the list of traps. As additional traps are tested and certified for these species they will be added to this list of legal traps – traps for these species are not legal until they have been added to BC's regulations.

If no certified trap is available for a given species after June 2007, current trap types and/or models will be allowed for the given species until a reasonable number of traps have been certified through the aforementioned process.

Please consult the Ministry's website at www.gov.bc.ca/hunting or the Fur Institute of Canada website at www.fur.ca for a list of killing traps currently certified for lynx, weasel and river otter. Notice is being given now of these intended regulation changes to allow trappers sufficient time to acquire certified traps for these species.

Since 1999, the Province of British Columbia has been moving towards meeting its obligations under the Agreement. The implementation of the Agreement allows trappers to continue to market their furs internationally and will ensure Canada continues to play a leading role in the research, development and implementation of humane trapping methods to effectively manage our fur resource.

For more information on the Agreement and to see an updated list of traps currently meeting the standards of the Agreement, please visit the Fur Institute of Canada's website at www.fur.ca.

Use of Road-Kill Wildlife

▶ Trappers may pick up and transport any dead mule deer, white-tailed deer, elk, moose, black bear, or any wildlife listed in Schedules B or C (see the "What is Wildlife?" section for current schedules) if:

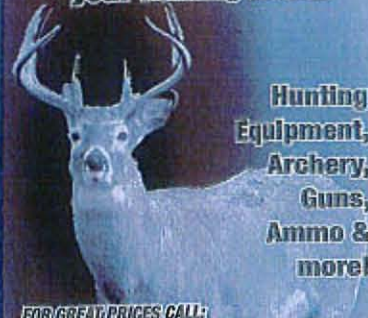
- (a) the wildlife is dead as a result of colliding with a motor vehicle, other than a motor vehicle operated by the trapper;
- (b) the meat of the wildlife is unfit for human consumption;
- (c) the carcass of the wildlife is to be used only
 - (i) by the trapper, and

(ii) as bait for traps set under the authority of the trapper's licence or licence exemption; and

- (d) at the time of possession and transportation, the trapper has, on his or her person, the trapper's current trapping licence or proof of the trapper's licence exemption.

▶ Trappers who pick up road-kill wildlife to use as bait must, within 30 days of picking up the road kill, complete a "Trapper Road Kill Possession Report Form" (available at any regional office, Service BC office, or on the Ministry website: www.gov.bc.ca/hunting and submit it to the address shown on the

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form.

▶ Trappers must retain a copy of every completed Trapper Road Kill Possession Report Form for at least 2 years after the date of pick up of the road kill described on the form.

Bait for traplines

Trappers may keep the carcass of a Beaver, Coyote, Ermine, Fox, Marmot (except Vancouver Island Marmots), Mink, Mole, Muskrat, Prairie dog, River Otter, Squirrel (ground, flying, Douglas, red), or wildlife described in Schedules B or C

TRAPPING REGULATIONS

(see the "What is Wildlife?" section for current schedules) trapped out of season if:

- (a) the wildlife carcass is to be used only by the trapper, and
 - (i) as bait for traps set under the authority of the trapper's licence or licence exemption, and
- (b) at the time of possession and transport, the trapper has, on his or her person,
 - (i) his or her current trapping licence or proof of licence exemption, and
 - (ii) a permit issued under section 2 (c) (iii) of the Permit Regulation, BC Reg. 253/2000, permitting him or her to trap that wildlife during the closed season.

Collared, Implanted or Ear-tagged Furbearing Animals

▶ Several furbearing animal research projects are under way within the province. Please report the harvest of any collared, implanted or ear-tagged animal and return collars or implants to the nearest Ministry regional office. Radio collars and implants are property of the Crown and must be returned.

Trapline Cabins

▶ Trappers must register their trapline cabins that are on Crown land. Cabin applications may take six months or more to process. Contact the Ministry regional office in the area of the trapline for more information. See below for more information on trapline cabins in parks.

Ecological Reserves, Provincial Parks, & Recreation Areas

▶ Trapping within ecological reserves is prohibited.

▶ Registered trapline tenure within Provincial Parks is subject to the provisions of the *Park Act* and its regulations. Trappers are required to obtain a Park or Resource Use Permit to trap that part of their trapline occurring within a Provincial Park or Recreation Area. This permit can be obtained from FrontCounter BC. (see page 24).

Trapline cabins in Provincial Parks and Recreation Areas also require authorization by a Park Use or a Resource Use Permit.

TRAPLINE REGISTRATION USE & RELINQUISHMENT

▶ It is an offence to set a trap for, hunt, kill, take or capture a furbearing animal in any area of the province unless you are the registered holder of the trapline for that area or are authorized by regulation or permit.

▶ Registration of a trapline on Crown land may only be granted to a person 19 years

of age or older who is a citizen of Canada or has the status of a permanent resident of Canada.

- ▶ No more than one trapline shall be registered to a person unless traplines are adjoining, and a fur management plan is approved by the Regional Manager.
- ▶ Registration of a trapline does not:
 - give the holder of a trapline any proprietary rights in wildlife, or
 - restrict the rights of another person to hunt or capture wildlife where authorized by regulation or permit.
- ▶ The boundaries of a trapline are defined by the Regional Manager.
- ▶ The relinquishment or transfer of a trapline must be approved by the Regional Manager.
- ▶ No person shall continue to hold a registered trapline unless he or she:
 - carries on active trapping on his or her registered trapline to the satisfaction of the Regional Manager; or
 - obtains permission from the Regional Manager to temporarily discontinue the use of his or her registered trapline for a period not exceeding two years, or
 - uses or causes the use of his or her trapline by a licensed trapper or a person exempted from holding a licence.

▶ A person fails to use a trapline where, within a year, that person fails to take from the trapline furbearing animals of a value of \$200, or 50 pelts, except where it is unreasonable for that value of animals or number of pelts to be taken from the trapline.

▶ The Province reserves the right to remove nuisance animals from Crown land, whether or not the Crown land in question is under a trapline registration.

OTHER RESTRICTIONS AND INFORMATION

▶ The Assigned Trapper Number (ATN) is required by the Fur Trader when accepting, exporting and selling fur. It is also required when paying fur royalties. Please remember to write your ATN on a slip of paper or letter when shipping your fur to a fur trader. This will prevent delays in getting your furs to market and cash returns to you. Fur traders cannot ship or sell fur without recording your ATN.

▶ You are reminded that, under Sections 247 and 446 of the Criminal Code of Canada, it is an offence for anyone to wilfully cause, or permit to be caused, unnecessary pain, suffering or injury to an animal or injury to a person.

▶ As approved humane traps become available, trapping regulations restricting or prohibiting the use of certain other traps

in the capture of various animals will be brought into effect. Please see the notice on page 91.

▶ A person who knowingly damages or interferes with a lawfully-set trap commits an offence.

▶ It is an offence to have live wildlife in your personal possession except under a licence or permit or as provided by regulation. A trapping licence does NOT authorize the possession of live wildlife.

▶ Any raw fur or skin of a furbearing animal shipped out of the province for commercial purposes must be accompanied by an Export Permit.

▶ When trapping near recreational areas or communities, trappers should evaluate whether lethal traps are necessary at the site. It is important to remember that the landscape is utilized by a number of different user groups and that the safety of non-target species is vital to good trapline management. Warning signs should be used to inform people of trapping activities.

COMPULSORY REPORTING & INSPECTION

▶ In order to better record the harvest of furbearing animals, the Wildlife and Habitat Branch requires that certain species be reported or submitted to a Ministry office. The information gathered is critical to the management of these populations, and trapper compliance is needed to ensure that seasons are properly set. Please review the following requirements and keep accurate records pertaining to them.

Compulsory Reporting

▶ Trappers must, within 15 days following the end of the trapping season, report the harvest of:

- **fisher** in all MUs, **other than region 3**, when trapped in a fisher open season;
- **wolverine** in regions 3, 5, 6 and 7;
- **lynx** in region 8;
- **bobcat** in MUs 1-14 and 1-15, and in regions 2 and 8; and
- **wolf** in regions 1 and 2.

▶ Compulsory reporting forms are available at any Ministry regional office and www.gov.bc.ca/hunting. Reporting may be done by mail (to the address on the form), phone or in person.

When reporting, please give the following information:

- name, address and Assigned Trapper Number (top of licence).
- location and date of kill,
- type of trap and set used,
- number of days the trap was set before the animal was killed, and
- the sex and age class of the animal.

Compulsory Inspecting

- ▶ Trappers must submit a carcass and pelt of the following to a Ministry office, within 15 days following the end of the trapping season:
 - furbearers that are killed incidentally in areas with no open season; and
 - fisher in all MUs when trapped outside a fisher open season.

These animals cannot be reclaimed by the trapper and may be donated by the Province to the Trapper Education Program.

- ▶ Trappers must submit the following to a compulsory inspection center, within 15 days following the end of the trapping season:
 - fisher in region 3;
 - wolf in region 4;
 - wolverine in regions 1, 2, 4 and 8;
 - weasel in region 1 and MUs 6-12 and 6-13, and a long-tailed weasel in MU's 2-3, 2-4, 2-6, 2-18 and 2-19;
 - lynx in MUs 1-14 and 1-15, regions 2 and 4; and
 - bobcat in region 4.
- ▶ Trappers must provide the following to the compulsory inspection center:
 - entire carcass of the animal and the pelt,
 - name, address and Assigned Trapper Number (top right corner of licence),
 - location and date of kill,
 - type of trap and set used, and
 - number of days the trap was set before the animal was killed.

LICENCE AND REGISTRATION FEES

▶ Applications for trapping licences are available at www.frontcounterbc.gov.bc.ca. For assistance with your application please contact FrontCounter BC at 1-877-855-3222. (See Wildlife Permits & Commercial Licences article, page 24.)

▶ The fees payable for the issuance of the following licences are:

1. For a trapping licence issued to a citizen or permanent resident of Canada to trap furbearing animals (includes Habitat Conservation Trust Foundation surcharge)
 - One Year Licence \$40.00
 - Five Year Licence \$200.00
2. For a duplicate licence to a person who, upon satisfactory proof, shows that his/her licence has been lost or destroyed \$10.00
3. To transfer registered trapline rights to a person or group of persons \$50.00
4. For a fur trader's licence \$100.00
5. For a fur trader to trade from a place of business in another province \$400.00

Note: Trapping licences shall be valid from the date of issuance to June 30.

FUR ROYALTY REGULATIONS

- ▶ Royalty must be paid by a person to keep the pelt or skin of a furbearing animal (not raised in captivity) lawfully taken under their TRAPPING licence, unless that person sells the pelt or skin to a licensed fur trader.
 - ▶ Royalty fee payments may be submitted by mail or courier with cheque (payable to The Minister of Finance), money order or credit card to any FrontCounter BC location (see page 24).
 - ▶ If the pelt or skin of a furbearing animal was lawfully taken under a person's HUNTING licence, a royalty does not need to be paid, unless that person intends to offer the pelt or skin for sale.

Fur Royalties

- ▶ **Royalty payments for pelts/skins is set at 3% of the average price paid at auction for the pelt or skin of the particular species over the preceding three years.**
- ▶ **Royalty values vary from year to year, and generally range from between \$0.25 to \$10 per pelt, depending on the species.**
- ▶ **Because royalties vary from year to year, they are not included in this two year synopsis. Visit www.gov.bc.ca/hunting for the current year fur royalties.**

TRAPPER EDUCATION PROGRAM

▶ British Columbia is committed to regulating humane traps as they become available and ensuring that trappers are educated in the use of humane traps. All trappers have a responsibility to ensure they are trained and use the most humane traps available, that furbearing animals in their trapping areas are managed wisely, and pelts are handled professionally.

▶ It is an offence to trap unless you have completed a Trapper Education Program (TEP) approved by the Director of the Wildlife and Habitat Branch. Approved TEP courses include those obtained in British Columbia since July 1, 1982; from Quebec since July 1, 1988; and from the Yukon, Alberta and Ontario since July 1, 1989.

▶ In cooperation with the Ministry, the BC Trappers Association (BCTA) delivers TEP.

▶ TEP courses are 3 days in length.

▶ The cost of the TEP course is \$390.00.

▶ The BC Trapper Education Manual is available from the BCTA (who produced and published it) at TEP courses for \$35.00.

▶ Instructors are located around the Province. The demand for TEP courses continues to be high and the delivery of a course is subject to instructor availability.

▶ If you are interested in TEP, please contact BC Trappers Association

PO Box 1063, Prince George, BC V2L 4V2
Phone: 250-962-5452, fax: 250-962-5462.

LEAST WEASEL INFORMATION WANTED

Least weasels are the smallest carnivore in the world and also the one we know the "least" about. To get a better picture of where the species occurs in BC, FTs are interested in getting information from trappers about this species. You can tell least weasels apart from other weasels by their tails – usually <2" long with a few or no black hairs on the tip (much less than ermines or long-tailed weasels). If you have caught or seen least weasels in the past 10 years, please call the Weasel Hotline at 1-888-223-4376 or email weasels@artemiswildlife.com and pass along this important information.

IMPORTANT NOTICE ABOUT FISHERS

▶ Fishers are blue-listed in B.C., but trapping seasons are open in areas of the province that can support a harvest. All fishers trapped during an open season must be Compulsory Reported, and those incidentally trapped in areas or at times with no open season must be Compulsory Inspected (see Compulsory Reporting/Inspection requirements, page 92). Fisher populations will continue to be assessed as new data becomes available. Trappers are encouraged to help provide this data by ensuring all fishers taken are compulsory reported or inspected in a timely manner.

▶ To minimize incidental capture of fisher in marginal areas and to enhance populations, marten boxes can be modified by making them longer and the entry hole $\leq 2\frac{1}{4}$ " in diameter (see diagram below).



Marten box modified with fisher exclusion plate. The exclusion plate splits in middle and is held in place with thick rubber straps to allow of extraction of an animal.

Population Enhancement

▶ Establish food sites for fishers by hanging carcasses in trees to reduce competition by other land predators.

▶ Finish marten trapping early in the season to reduce incidental capture of adult female fishers.

SPECIES	CERTIFIED KILLING TRAPS		
BEAVER <i>Underwater or on land</i>	Bélisle Classique 330 Bélisle Super X 280 and Super X 330 B.M.I. 280 Bodygripper, 330 Bodygripper B.M.I. BT 300 Bridger 330	Duke 280 and Duke 330 LDL C280 and LDL C280 Magnum LDL C330 and LDL C330 Magnum Rudy 280 and Rudy 330 Sauvageau 1000-11F	Sauvageau 2001-8, 2001-11, 2001-12 Species-Specific 330 Dislocator Half Magnum Species-Specific 440 Dislocator Half Magnum Woodstream Oneida Victor Conibear 280 Woodstream Oneida Victor Conibear 330
BOBCAT	Bélisle Super X 280 and Super X 330 B.M.I. 220 Body Gripper B.M.I. 280 Body Gripper B.M.I. 220 Magnum Body Gripper B.M.I. 280 Magnum Body Gripper	Bridger 220 Bridger 280 Magnum Body Gripper LDL C220 and C220 Magnum LDL C280 Magnum LDL C330 and C330 Magnum	Rudy 330 Sauvageau 2001-8 Sauvageau 2001-11 Woodstream Oneida Victor Conibear 330
CANADA LYNX	Bélisle Super X 280 and Super X 330 B.M.I. 220 Body Gripper B.M.I. 280 Body Gripper B.M.I. 220 Magnum Body Gripper B.M.I. 280 Magnum Body Gripper	Bridger 220 Bridger 280 Magnum Body Gripper Duke 280 LDL C220 LDL C220 Magnum	LDL C330 LDL C330 Magnum Rudy 330 Sauvageau 2001-8, Sauvageau 2001-11 Woodstream Oneida Victor Conibear 330
FISHER	Bélisle Super X 120 Bélisle Super X 160 Bélisle Super X 220 Koro #2	LDL C160 Magnum LDL C220 Magnum Rudy 120 Magnum Rudy 160 Plus and Rudy 220 Plus	Sauvageau 2001-5 Sauvageau 2001-6 Sauvageau 2001-7 Sauvageau 2001-8
MARTEN	Bélisle Super X 120 Bélisle Super X 160 B.M.I. 126 Magnum Body Gripper LDL B120 Magnum	LDL C160 Magnum Koro #1 and Koro #2 Northwoods 155 Rudy 120 Magnum	Rudy 160 Plus Sauvageau C120 Magnum Sauvageau 2001-5 Sauvageau 2001-6
MUSKRAT <i>On land only</i>	Bélisle Super X 110 and Super X 120 B.M.I. 120 Body Gripper B.M.I. 120 Body Gripper Magnum B.M.I. 126 Body Gripper Magnum Bridger 120 Bridger 120 Magnum Body Gripper Bridger 155 Magnum Body Gripper Duke 120	Koro Muskrat Trap Koro Large Rodent Double spring LDL B120 and LDL B120 Magnum Oneida Victor 120 Stainless Steel Oneida Victor Conibear 110-3 Stainless Steel Ouell 411-180 and Ouell RM Rudy 110	Rudy 120 and Rudy 120 Magnum Sauvageau C120 Magnum Sauvageau C120 "Reverse Bend" Sauvageau 2001-5 Triple M WCS Tube Trap International Woodstream Oneida Victor Conibear 110 Woodstream Oneida Victor Conibear 120
MUSKRAT <i>Underwater only</i>	Any jaw-type trap (body gripping or leghold) set as a submersion set that exerts damping force on a muskrat and that maintains this animal underwater.		
OTTER	Bélisle Super X 220 and Super X 280 Bélisle Super X 330 LDL C220 and LDL C220 Magnum LDL C280 Magnum	Rudy 220 Plus Rudy 280 and Rudy 330 Sauvageau 2001-8 Sauvageau 2001-11	Sauvageau 2001-12 Woodstream Oneida Victor Conibear 220 Woodstream Oneida Victor Conibear 280 Woodstream Oneida Victor Conibear 330
RACCOON	Bélisle Classique 220 Bélisle Super X 160, 220 and 280 B.M.I. 180 and B.M.I. 220 B.M.I. 280 Body Gripper B.M.I. 280 Magnum Body Gripper Bridger 160 and Bridger 220	Bridger 280 Magnum Body Gripper Duke 160 and Duke 220 Koro #2 LDL C160 and LDL C160 Magnum LDL C220 and LDL C220 Magnum LDL C280 Magnum	Northwoods 155 Rudy 160, 160 Plus, 220 and 220 Plus Sauvageau 2001-5, 2001-7 and 2001-8 Species-Specific 220 Dislocator Half Magnum Woodstream Oneida Victor Conibear 160 Woodstream Oneida Victor Conibear 220
WEASELS	Bélisle Super X 110 and Super X 120 B.M.I. #60 B.M.I. 120 Magnum Body Gripper B.M.I. 126 Magnum Body Gripper Bridger 120 Bridger 120 Magnum Body Gripper Bridger 155 Magnum Body Gripper	Koro Muskrat Trap and Koro Rodent Trap Koro Large Rodent Double Spring LDL B120 Magnum Ouell 411-180 and Ouell 3-10 Ouell RM Rudy 120 Magnum Sauvageau 2001-5	Sauvageau C120 Magnum Sauvageau C120 "Reverse Bend" Triple M Victor Rat Trap WCS Tube Trap Int'l Woodstream Oneida Victor Conibear 110 Woodstream Oneida Victor Conibear 120
SPECIES	CERTIFIED LEGHOLD RESTRAINING TRAPS		
BOBCAT	Bélisle Footsnare #6 and Bélisle Sélectif Oneida Victor #1.5 Soft Catch equipped with 4 coil springs Oneida Victor #1.75, offset, laminated jaws equipped with 2 coil springs Oneida Victor #3 Soft Catch equipped with 2 coil springs and 4 coil springs Oneida Victor #3 equipped with 3/16-inch offset, double rounded steel jaw laminations (3/16-inch on topside of jaw and 1/4-inch on underside of jaws), with 2 coil springs		
LYNX	Bélisle Footsnare #6, Bélisle Sélectif Oneida Victor #3 Soft Catch equipped with 2 coil springs and 4 coil springs Oneida Victor #3 equipped with at least 8 mm thick, non-offset steel jaws, 4 coil springs and an anchoring swivel centre mounted on a base plate		

TRAPPING METHODS

	Killing Snare	Modified Leghold	Leghold - Submerging	Killing Trap	Live Box Trap	Foot Snare	Rifle, Shotgun or Bow	Egg Trap
Beaver	X		X	X ⁵	X		X	
Black Bear*							X ^{3,4}	
Bobcat	X	X		X ⁵	X	X	X	
Coyote	X	X		X	X	X	X	
Fisher	X			X ⁵	X		X	
Fox	X	X		X	X	X	X	
Lynx	X	X ⁶		X ⁵	X	X	X	
Marten	X			X ⁵	X		X	
Mink	X		X	X	X		X	
Muskrat	X		X ²	X ⁵	X		X	
Otter	X		X	X ⁵	X		X	
Raccoon	X			X ⁵	X		X	X
Skunk	X			X	X		X	
Squirrel	X			X	X		X	
Weasel	X			X ⁵	X		X	
Wolf	X	X ¹		X	X	X	X ³	
Wolverine	X			X	X		X	

"X" means that this is a legal trapping method in B.C.

* black bear may not be trapped by placing bait or by using a dead animal or part of it as bait.

- For solidly-fastened leghold traps designed to trap wolves, no more than 60 cm of chain between the trap and the point to which it is fastened may be used.
- A minimum weight of 150 g must be securely attached to all muskrat submerging sets smaller than size #11/2.
- It is an offence to shoot/kill a black bear, or a wolf not caught in a trap or a snare, with a rifle using a rimfire cartridge, or with a shotgun with a bore size of less than 20 gauge, or using shells of shot size smaller than No. 1 Buck.
- Refer to the Hunting Methods table, page 16, for firearm and archery requirements for black bear; the Bears section page 9, and the Important Notice for Bear Hunters page 63.
- Only killing traps certified under the AH-TS may be used see list on page 94.
- Only leghold restraining traps certified under the AH-TS may be used see page 94.

NOTE: Use of certified bobcat restraining and killing traps will become mandatory in the fall of 2018. Use of certified restraining traps will become mandatory for wolf and beaver (cages) in the fall of 2020.

It's Unlawful

You should know that it is unlawful to:

- Use a leghold trap which has teeth or other projections on the jaws of the trap.
- Use a killing snare on land, unless the snare is equipped with a locking device, or is designed to catch squirrels or hares, or is a mechanically-powered killing snare.
- Use a snare made of wire heavier than 20 gauge unless licenced or authorized to trap.
- Use a snare made of braided wire unless licenced or authorized to trap.
- Set spring poles or running poles unless they are equipped with a killing trap.
- Use a trap equipped with a spearing device.
- Use any Conibear trap larger than, but not including, #220 for land sets within any municipality in the Province.
- Use a rat trap unless the bait and trigger are completely covered, with an opening not larger than 4.5 cm wide and 5 cm high.
- Trap with a rifle using a full metal jacketed non-expanding bullet, or a tracer, incendiary, or explosive bullet, or with a shotgun using a tracer or incendiary shot shell.
- Use electronic or recorded calls for trapping furbearing animals other than for trapping wolf, coyote, bobcat or lynx.
- To cause or allow dogs to pursue furbearers under the authority of a trapping licence.

Trappers should be aware of the restrictions described in the It's Unlawful section (page 14) and the Hunting Methods and Restrictions sections (pages 16 and 17).

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City of Salmon Arm Solar PV Feasibility Review for City Hall, Fire Hall No. 3, and the Art Centre

July 8, 2019

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1. Executive Summary

Subject to professional structural review, demonstration rooftop solar PV systems (4 – 10 kWp) installations are feasible for City Hall, Fire Hall No. 3, and the Art Centre.

Very Good to Excellent solar PV performance can be expected from all three sites with Fire Hall No. 3 having more shading constraints than the others.

In all cases electrical infrastructure will either directly accommodate demonstration systems (City Hall) or can be made to with minor modifications (Fire Hall No. 3 and Art Centre).

City Hall offers more unconstrained roof space and opportunity for future expansion than the other buildings. However, the solar PV business case is more attractive for Fire Hall and Art Centre buildings due to their higher electrical energy rate; BC Hydro Small General Service Rate (\$0.1139/kWh) versus Large General Service Rate (\$0.0606/kWh) for City Hall.

The Art Centre will have the largest annual electrical grid consumption reduction impacts through demonstration PV system installation; 26% – 53% annual reduction versus 13% – 33% for Fire Hall No. 3 and 0.8% – 2.0% for City Hall. The Art Centre may also be the most operationally conducive building for public information sessions, visits, and tours potentially associated with a demonstration system installation.

Summarized findings for each building are provided below with more details given in sections 2.7, 3.7, and 4.7.

City Hall

Rooftop space would easily accommodate a 4 – 10 kWp rooftop demonstration system whose key metrics would include:

- BC Hydro grid energy consumption reduction by 0.8% – 2.0%
- Before tax annual electrical energy cost savings of \$281 - \$703 (at 2019 rates)
- Before tax (GST only) estimated installation costs of \$10,600 - \$24,000

Key metrics for an ultimate City Hall 108kWp rooftop solar PV system include:

- BC Hydro grid energy consumption reduction by 22%
- Before tax annual electrical energy cost savings of \$7972 (at 2019 rates)
- Before tax (GST only) estimated installation costs of \$221,400

Solar patio canopy and parking shelter options would also be viable though at considerably higher cost per watt than roof mounting.

Fire Hall No. 3

Rooftop array placement is constrained by obstacles and shading but a 4 – 10 kWp demonstration system could be accommodated with some care. Projected key metrics would include:

- BC Hydro grid energy consumption reduction by 13% – 33%
- After-tax annual electrical energy cost savings of \$583 - \$1415 (at 2019 rates)
- Before tax (GST only) estimated installation costs of \$11,130 - \$24,480

Projected key metrics for an ultimate 19.2 kWp rooftop solar PV system include:

- BC Hydro grid energy consumption reduction by 62%
- Before tax annual electrical energy cost savings of \$2664 (at 2019 rates)
- Before tax (GST only) estimated installation costs of \$45,120

Art Centre

Rooftop array placement is somewhat constrained by physical obstacles and shading but a 4 – 10 kWp demonstration system can be accommodated. Projected key metrics include:

- BC Hydro grid energy consumption reduction by 26% – 53%
- After tax annual electrical energy cost savings of \$708 - \$1416 (at 2019 rates)
- Before tax (GST only) estimated installation costs of \$13,260 - \$24,480

Projected key metrics for an ultimate 19.8 kWp capacity adding a solar parking shelter:

- BC Hydro grid energy consumption reduced to Net-Zero
- After tax annual electrical energy cost savings of \$2747 (at 2019 rates)
- Before tax (GST only) estimated installation costs of \$62,880

In all three cases projected installation costs assume roof structures can accommodate ballasted racking systems. Should professional structural review find otherwise, installed costs using mechanically attached racking will be somewhat higher.

2. Salmon Arm City Hall

City Hall is located at 500, 2 Avenue NE shown in Figure 1. The large roof space has good potential for solar arrays in various locations. Solar canopies over 2nd floor outdoor patios, or a solar parking shelter in the south parking lot could be other solar PV options to consider. More details are given below.



Figure 1: Salmon Arm City Hall and Law Courts Building

2.1 City Hall Solar Photography

Solar photography was done with the Solmetric SunEye 210 at various strategic locations of the roof, patio areas and parking lot as shown in. Figure 2.

Good solar PV performance depends on arrays being as shade free as possible to maximize direct (unshaded) solar irradiation. Solar access score, is the percentage of available direct solar irradiation expected to strike the location during a specific time period after accounting for external shade caused by trees, mountains, or man-made structures. The Solmetric SunEye calculates solar access on a monthly basis, then deduces annualized, Summer (May-Oct), and Winter (Nov-Apr) scores.



Figure 2: City Hall Building Solar Photography Sites

Solar access results for each City Hall location are summarized in Table 1. The very high annual solar access scores (96%-99%) suggest excellent solar PV performance for all the roof locations considered. For the parking lot locations 1 and 2, solar access is reduced due to shading by nearby trees and lamp standards. Further details are provided below.

Location	Annual	Summer	Winter
Upper North Roof	99%	100%	96%
West Location 1	96%	99%	92%
West Location 2	99%	99%	99%
South Location 1 & 2	98%	99%	97%
South West	99%	100%	98%
Patio Location 1 & 2	95%	96%	94%
Parking Lot Location 1 & 2	80%	89%	61%

Table 1: City Hall Solar Access Results

2.1.1 City Hall – Upper North Roof

Figure 3 shows the upper north roof section.



Figure 3: City Hall Upper North Roof

Figure 4 shows the charts for the annual sun paths, monthly solar access and shading obstruction elevation vs. azimuth for the Upper North roof section.

Panel Orientation: Tilt=10° -- Azimuth=180° -- **Skyline Heading = 176°**

GPS Location: Latitude=50.70074°N -- Longitude=119.27884°W

Solar Access: Annual: 99% -- Summer (May-Oct): 100% -- Winter (Nov-Apr): 96%

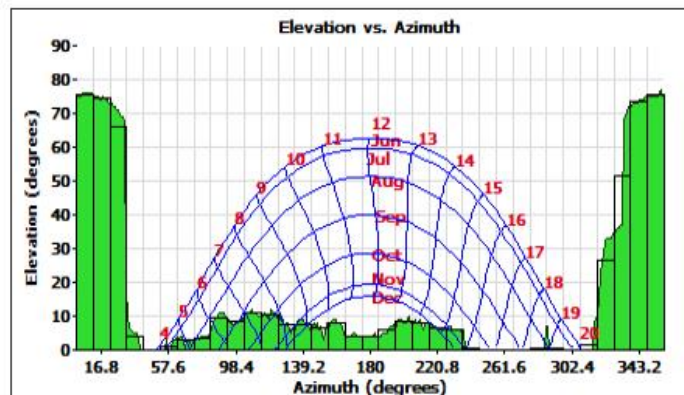
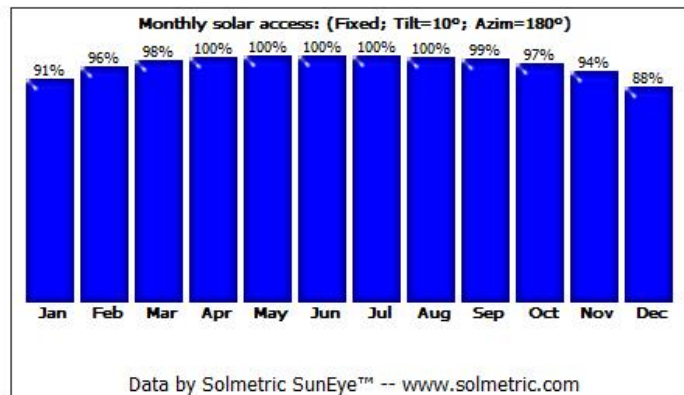
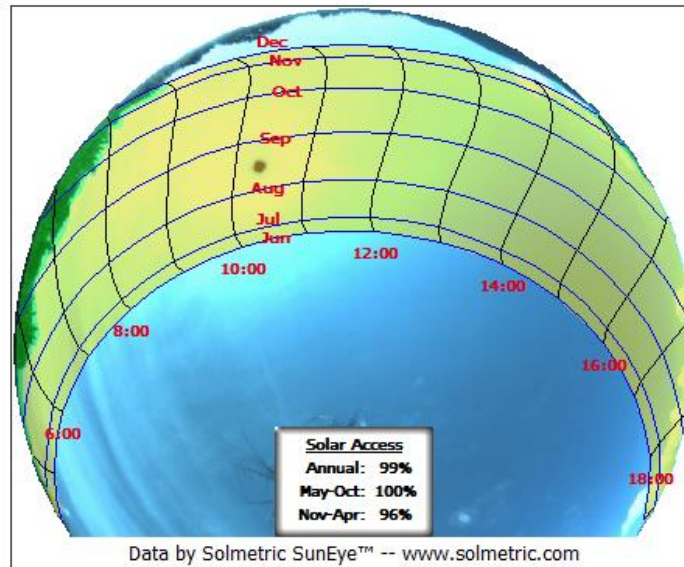


Figure 4: City Hall Upper North Roof Solar Access

2.1.2 City Hall – West Location 1

Figure 5 shows the charts for the annual sun paths, monthly solar access and shading obstruction elevation vs. azimuth.

Panel Orientation: Tilt=10° -- Azimuth=180° -- **Skyline Heading=178°**

GPS Location: Latitude=50.70060°N -- Longitude=119.27905°W

Solar Access: Annual: 96% -- Summer (May-Oct): 99% -- Winter (Nov-Apr): 92%

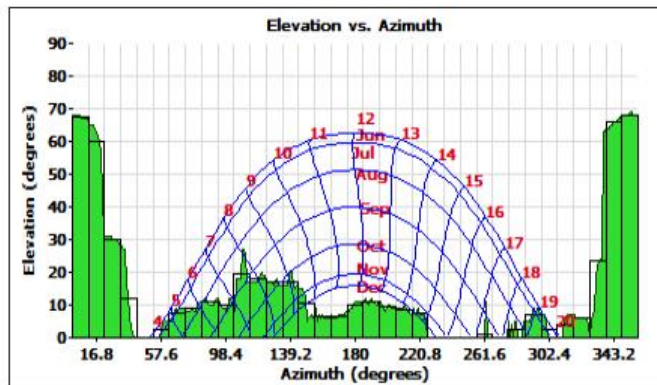
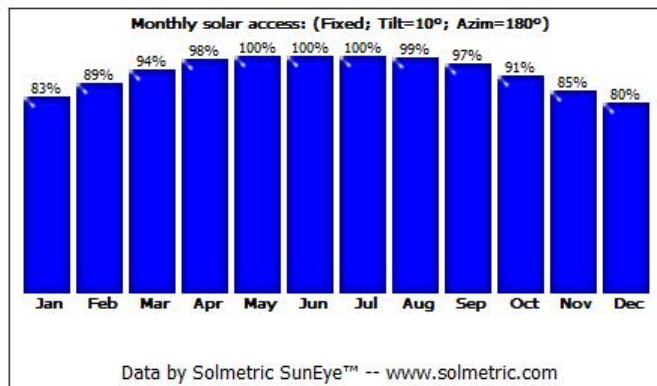
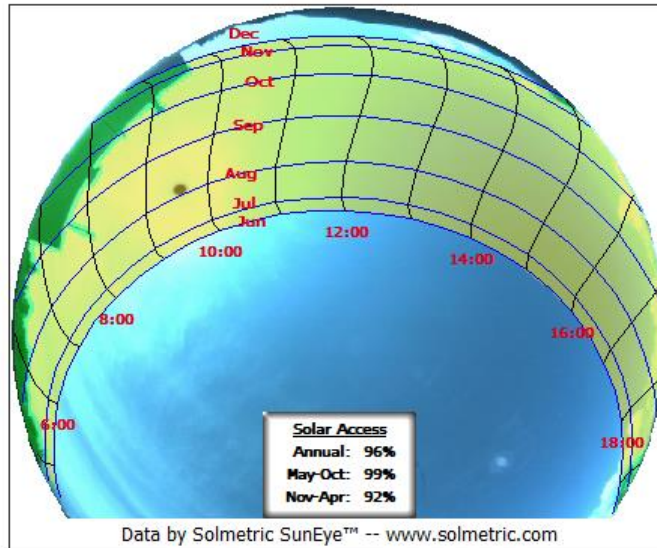


Figure 5: City Hall West Roof Location 1 Solar Access

2.1.3 City Hall – West Location 2

Figure 6 shows the charts for the annual sun paths, monthly solar access and shading obstruction elevation vs. azimuth.

Panel Orientation: Tilt=10° -- Azimuth=180° -- **Skyline Heading=174°**

GPS Location: Latitude=50.70072°N -- Longitude=119.27904°W

Solar Access: Annual: 99% -- Summer (May-Oct): 99% -- Winter (Nov-Apr): 99%

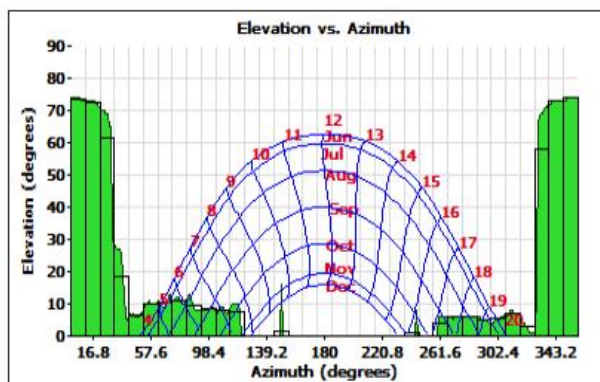
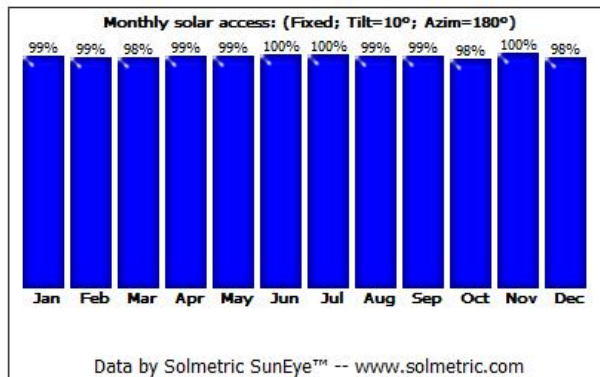
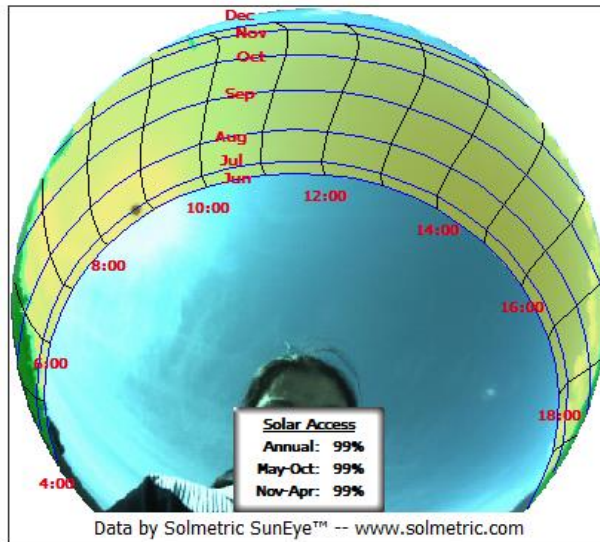


Figure 6: City Hall West Roof Location 2 Solar Access:

2.1.4 City Hall – South Location 1 & 2

Figure 7 shows the charts for the annual sun paths, monthly solar access and shading obstruction elevation vs. azimuth.

Panel Orientation: Tilt=10° -- Azimuth=180° -- **Skyline Heading=181°**

GPS Location: Latitude=50.70048°N -- Longitude=119.27894°W

Solar Access: Annual: 98% -- Summer (May-Oct): 99% -- Winter (Nov-Apr): 97%

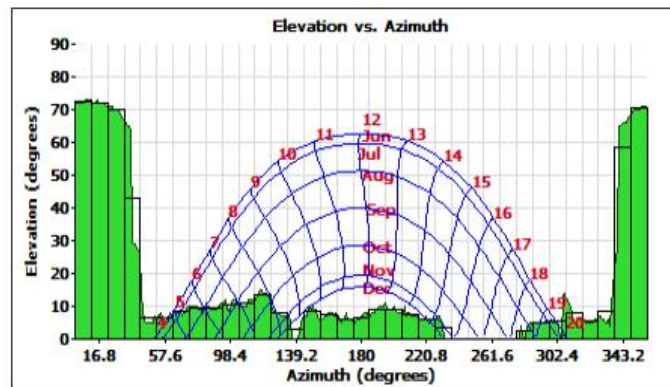
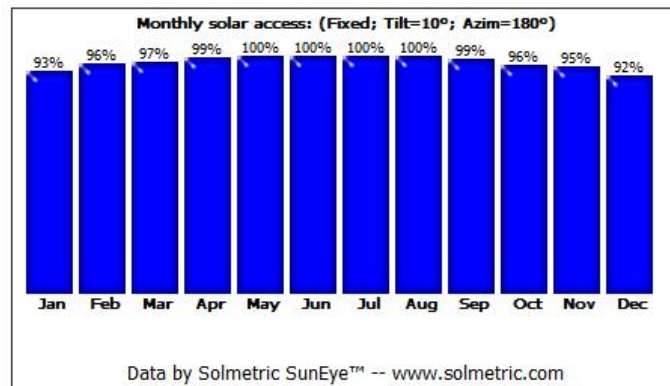
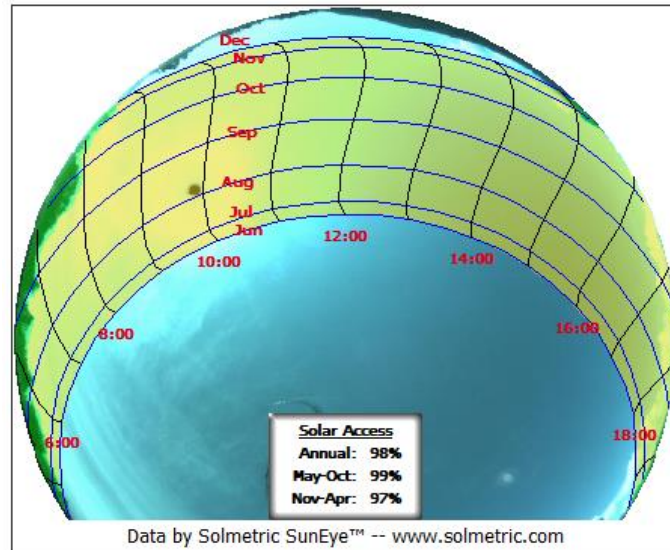


Figure 7: City Hall South Roof Solar Access

2.1.5 City Hall – South West

Figure 8 shows the charts for the annual sun paths, monthly solar access and shading obstruction elevation vs. azimuth.

Panel Orientation: Tilt=10° -- Azimuth=180° -- **Skyline Heading=181°**

GPS Location: Latitude=50.70048°N -- Longitude=119.27926°W

Solar Access: Annual: 99% -- Summer (May-Oct): 100% -- Winter (Nov-Apr): 98%

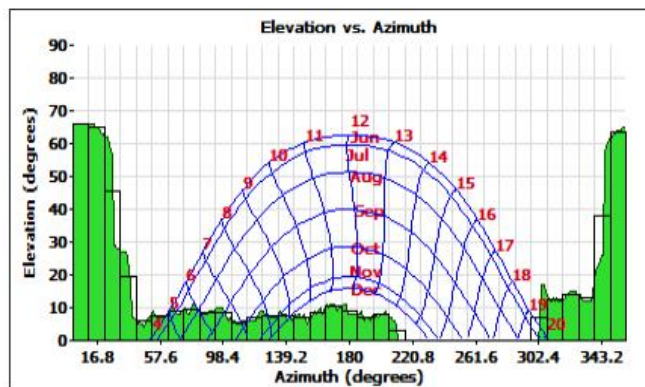
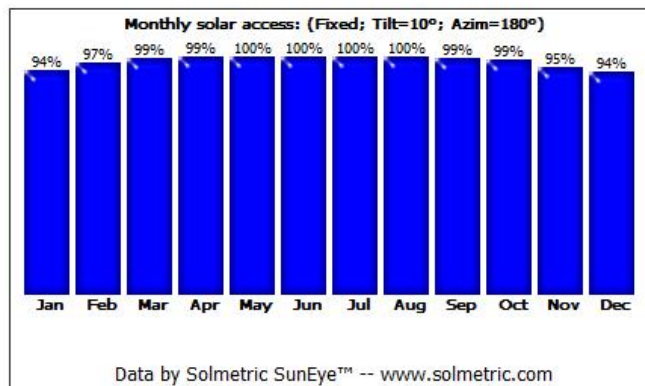
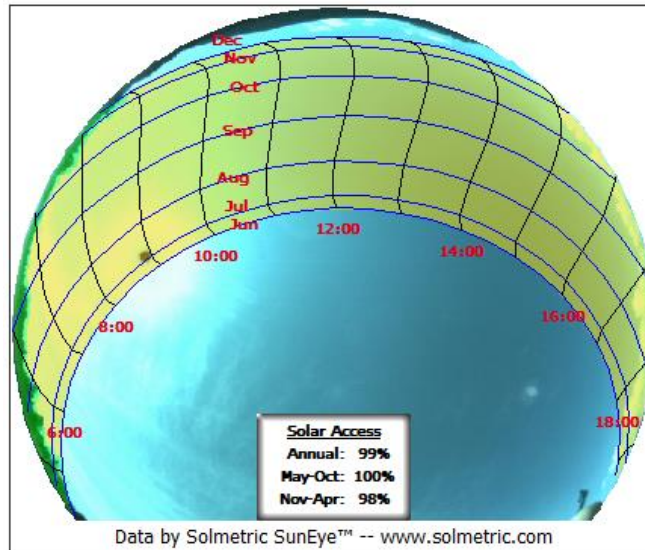


Figure 8: City Hall South West Roof Solar Access

2.1.6 City Hall – Patio Location 1 & 2

Figure 9 shows the charts for the annual sun paths, monthly solar access and shading obstruction elevation vs. azimuth.

Panel Orientation: Tilt=10° -- Azimuth=180° -- **Skyline Heading=176°**

GPS Location: Latitude=50.70038°N -- Longitude=119.27910°W

Solar Access: Annual: 95% -- Summer (May-Oct): 96% -- Winter (Nov-Apr): 94%

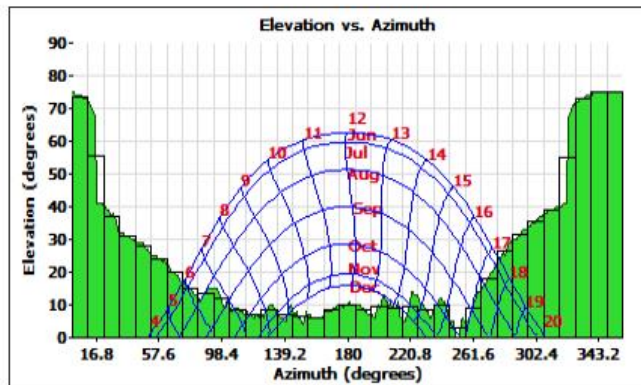
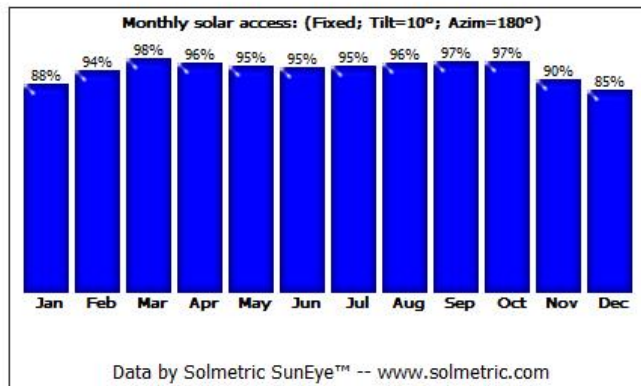
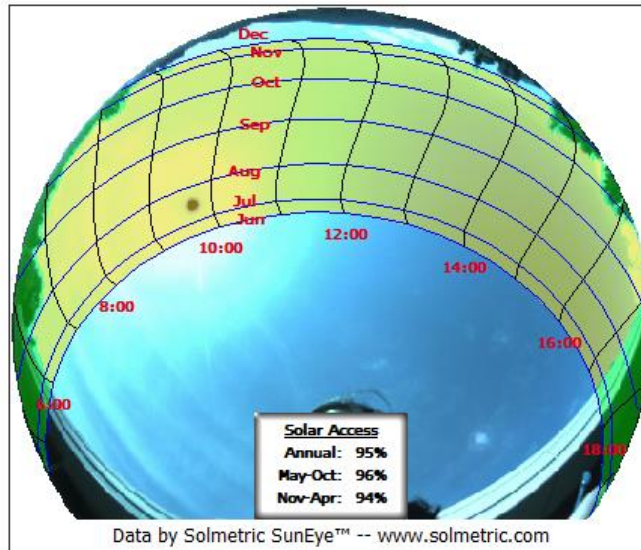


Figure 9: City Hall Patio Solar Access

2.1.7 City Hall – Parking Lot Location 1 & 2

Figure 10 shows the charts for the annual sun paths, monthly solar access and shading obstruction elevation vs. azimuth. Solar access scores are significantly reduced by existing trees and lamp standards.

Panel Orientation: Tilt=10° -- Azimuth=180° -- **Skyline Heading=183°**

GPS Location: Latitude=50.70002°N -- Longitude=119.27898°W

Solar Access: Annual: 80% -- Summer (May-Oct): 89% -- Winter (Nov-Apr): 61%

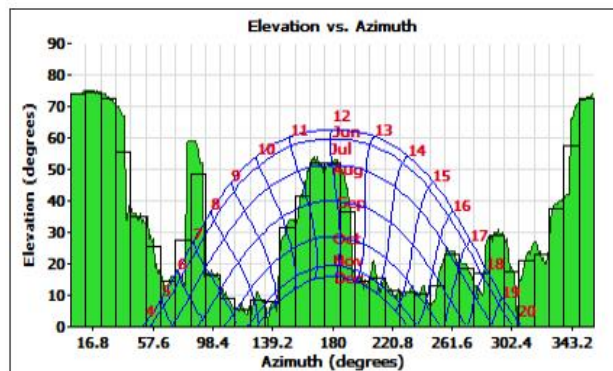
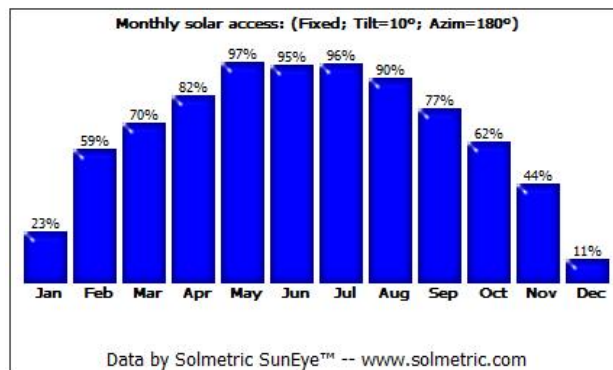
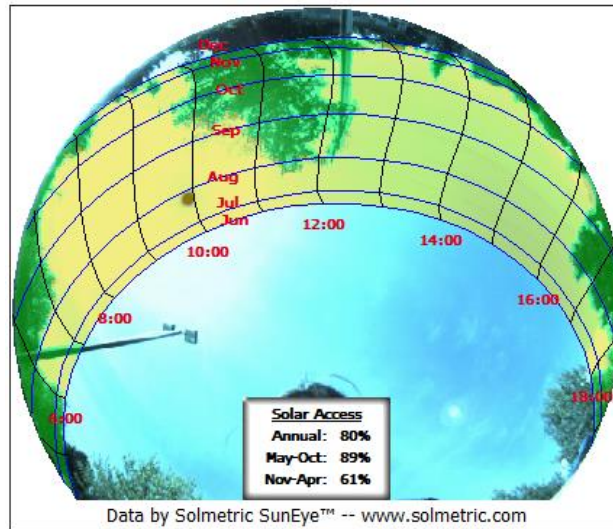


Figure 10: City Hall Parking Lot Solar Access

If a solar parking shelter were considered, we would advise the relocation of trees and lamp standards to reduce shading impacts. Figure 11 shows the significantly improved solar access scores for this location if shading by trees and lamp standards could be reduced.

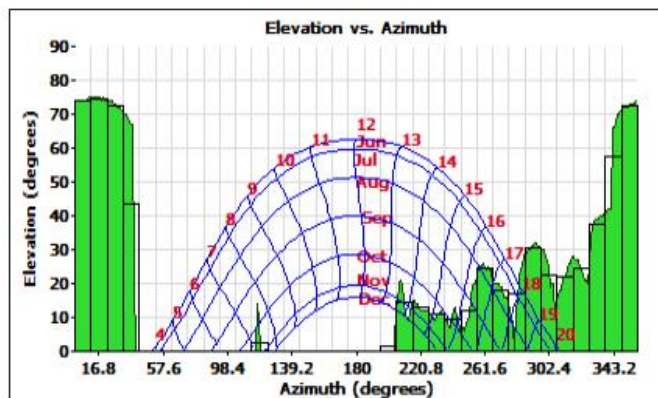
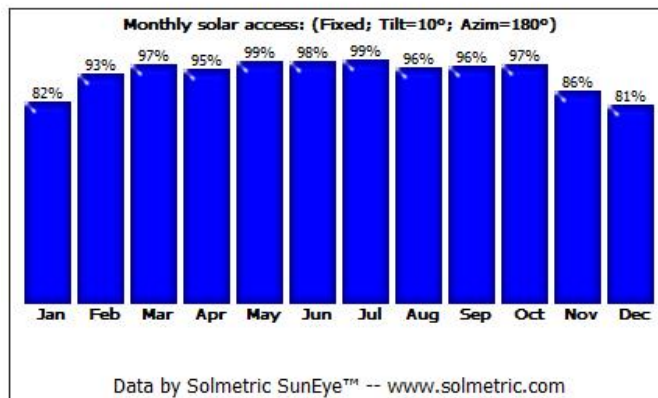
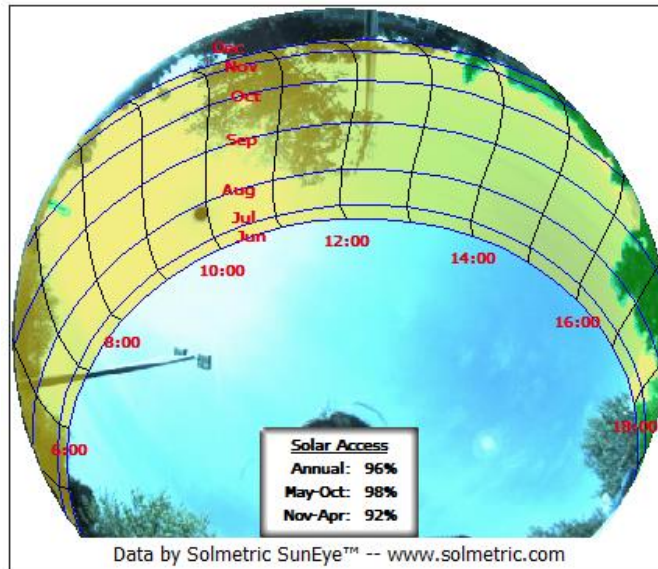


Figure 11: City Hall Parking Lot Solar Access with Shading Obstacles Removed

2.2 City Hall Array Placement, Sizing, and Mounting Options

The City Hall roof is extensive and will allow for varied PV array sizes and placement options as further described below. We have also considered patio solar canopy and solar parking shelter options which may be of interest in the future.

2.2.1 Roof Mounting Options and Considerations

The City Hall roof is extensive and will allow for varied PV array sizes and placement options. As shown in Figure 12, the majority of the roof is flat with two sections sloped at 5°; still considered flat for solar racking purposes. The surface of the roof is finished with an SBS torch-on membrane.

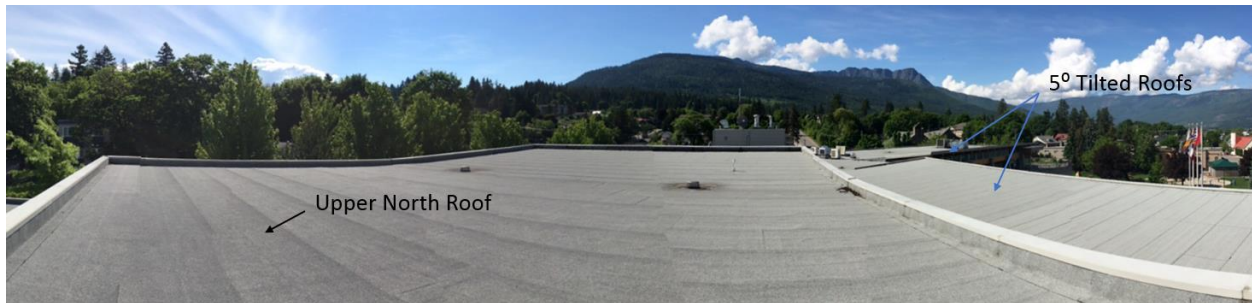


Figure 12: City Hall Roof Sections

Retrofitting solar PV to flat roofs is most easily done with ballasted racking systems provided the roof structure can safely manage the additional load. Ballasted racking secures arrays to the roof with carefully engineered concrete block ballast placement to meet site wind and seismic load requirements. Advantages of ballasted racking include ease of installation and minimizing roof membrane penetrations. Appendix A shows some examples of solar PV installations using ballasted racking.

A professional structural review would be needed to confirm targeted city hall roof sections can manage the impacts of solar arrays and proposed ballasted racking designs.

We considered maximum solar PV array sizes and placements suitable for the city hall roof while respecting roof edge safety and mechanical equipment maintenance clearances. As shown in Figure 13, our measurements and rooftop models suggest in the order of 296 solar PV modules (72 cell or 144 split cell types) could be accommodated. Figure 14 further breaks down PV capacity by roof section assuming the use of 365W solar modules.

We suggest sections 3 or 4 for initial installation of a small demonstration PV system. These are nearest the roof hatch and most safely accessed if installation tours were a consideration. Careful installation planning would allow ease of future expansion if desired. Subject to structural review, City Hall roof has sufficient PV array space to meet the current BC Hydro Net-Metering program limit of 100 kW_{AC} capacity. However, building electrical distribution equipment will limit this to 90 kW_{AC} as discussed in section 2.3.

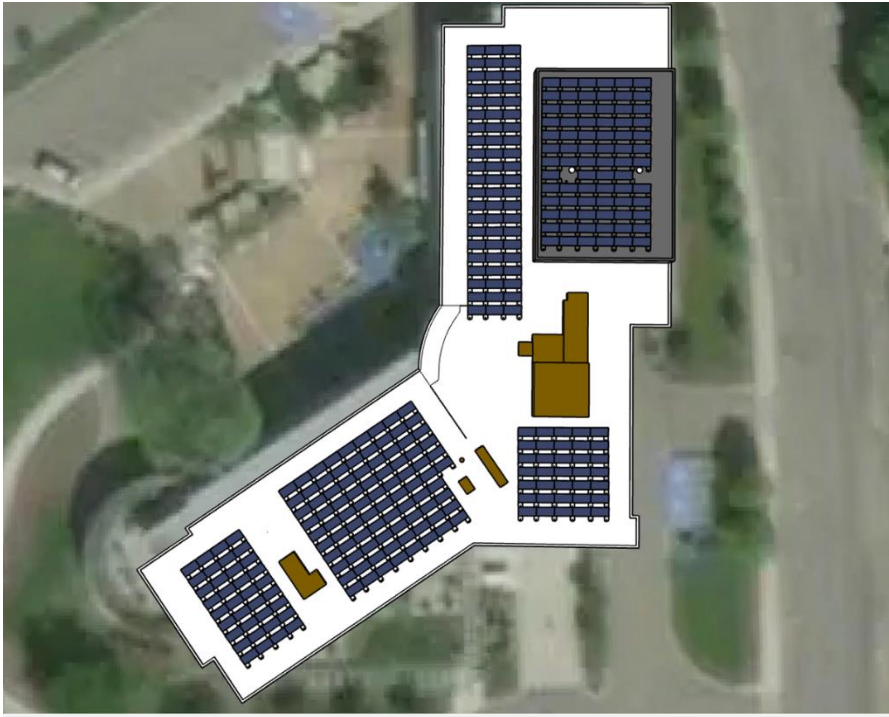
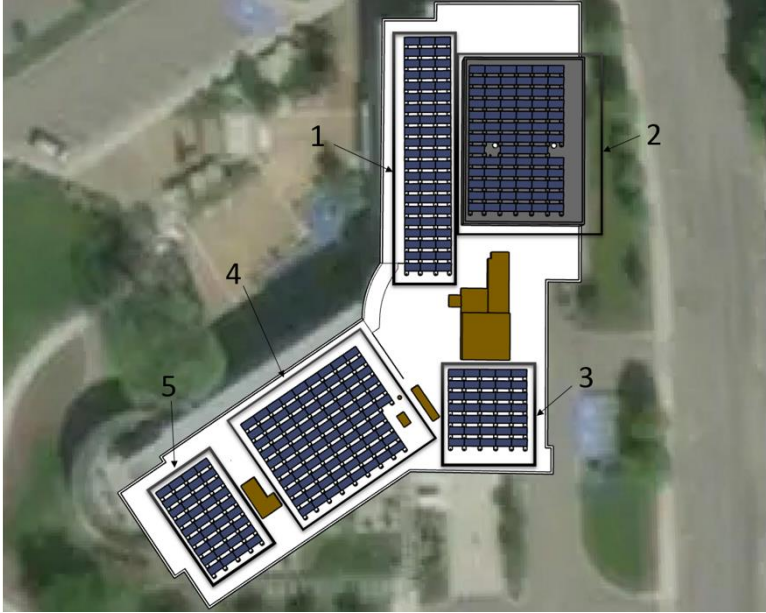


Figure 13: City Hall Roof – Maximum Solar PV Array Placement



Section #	# of Solar Panels	Total power (kWp)
1	63	23
2	76	27.7
3	35	12.8
4	86	31.4
5	36	13.1
TOTAL	296	108

Figure 14: City Hall Roof-top Breakdown of Solar PV Array Capacities

2.2.2 Patio Canopy and Parking Shelter Solar PV Options and Considerations

Alternatives to roof mounting for future consideration would be 2nd level patio canopies, and ground level parking shelters. Figure 15 and Figure 16 show the 2nd Level West and South patio locations while Figure 17 provides some examples of solar PV patio awning installations. Solar photography results previously shown in Figure 9 confirm the patio areas have excellent solar access scores.



Figure 15: Level 2 West Patio



Figure 16: Level 2 South Patio Areas

Parking lots on the south side of the building could be considered for solar parking shelters in the future provided shading were mitigated to improve solar access as shown in Figure 11. EV charging stations are frequently installed concurrently with solar parking structures to allow harvesting vehicle fuel from the sun. Figure 18 shows the City Hall south parking areas along with an example solar PV parking structure.

Example array layouts for 19.5 kWp total solar patio canopy capacity and a 20 kWp solar parking shelter are shown in Figure 19.



Figure 17: Solar Patio Awning Examples



Figure 18: City Hall South Parking Area and a Solar Parking Shelter Example



Figure 19: Example 19.5 kWp Solar Canopy and 20 kWp Parking Shelter Capacities

2.3 City Hall Solar Electrical Review

The electrical single-line drawing provided us for City Hall is included in Appendix B. BC Hydro grid supply enters the MDC (main distribution centre 1600A, 120/208V, 3P) in the mail electrical room 004, on the parkade level. The MDC supplies two sub-distribution centres (600A, 120/208V, 3P) SDC1 and SDC2 respectively in electrical rooms 138 (level 1) and 226 (level 2). SDC1 powers level 1 sub-panels 1A through 1G (excepting 1C) while SDC2 powers level 2 sub-panels 2A through 2F (excepting 2B).

Electrical rooms 004, 138, and 226 are directly aligned over/below each other with supply cable routing vertically through electrical room floor slabs as shown in Figure 20. While we were not able to enter it, the rooftop mechanical penthouse also appears to be aligned over room 226 below. Vertical alignment of rooms 004, 138, 226, and mechanical penthouse will simplify future solar PV cabling to the rooftop, though some floor slab coring may be required if existing cores cannot be utilized.



Figure 20: Electrical Cable Ceiling Slab Cores – Main Electrical Room 004

An emergency backup generator, auto-transfer switch, and emergency distribution panel have been added, but are not shown on the single-line. Based on our inspection, it appears supply has been reconfigured for sub-panels 2B and 1C to keep them powered via generator emergency panel during BC Hydro outages. Panels backed up by emergency generator should be avoided as a solar PV points-of-connection as grid-dependent solar PV inverters are not intended for parallel operation with emergency generation.

Based on panel locations, bus capacities, CEC Section 64 requirements, and cable access to rooftop arrays, we recommend distribution panels MDC (room 004), SDC1 (room 138), sub-panel 1A (room 138), or SDC2 (room 226) as suitable points-of-connection to the grid for solar PV generation. These allow maximum grid-connected solar PV generation up to 90 kWAC using MDC, 32.4 kWAC using SDC1 or SDC2, or 18 kWAC using sub-panel 1A as summarized in Table 2.



Figure 21: MDC - Room 004 – Spare Breaker Positions



Figure 22: SDC1 (Room 138) and SDC2 (Room 226) Spare Breaker Positions

Solar PV Point-of-Connection	Rated Bus Capacity (Amps)	Grid Supply CB (Amps)	Max Solar PV CB (Amps)	Max Solar PV Generation kW _{AC}
MDC - 004	1600	1600	250	90
SDC1 - 138	600	600	90	32.4
SDC2 - 226	600	600	90	32.4
SP 1A - 138	225	200	50	18

Table 2: Points-of-Connection and Associated Maximum Allowable Solar Generation

The BC Hydro Net-Metering program requires a single point-of-connection for on-site grid-connected generation. Sub-panel 1A would provide sufficient capacity for a 4-10 kWp demonstration project presently under consideration. However, given the extensive roof space and alternate PV options, the MDC would be a more advisable point-of-connection if providing for simplified future expansion is important to the City.

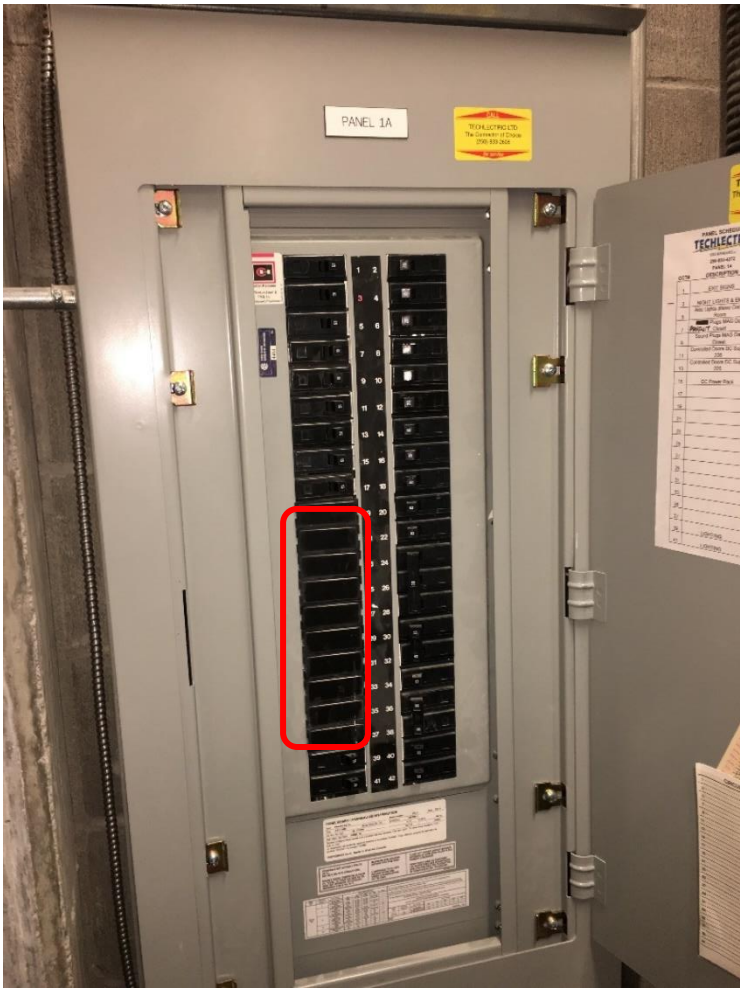


Figure 23: Sub-Panel 1A (Room 138) Spare Breaker Positions

2.4 City Hall Electrical Consumption and Demand

BC Hydro service is under the 1600 Large General Service (LGS) rate. Along with the basic energy charge there is also a demand charge corresponding to monthly peak demand (15-min sliding window). Power factor surcharges also apply if power factor drops below 90%. Rate 1600 energy and peak demand charges are \$0.0606/kWh and \$12.34/kW respectively at the time of writing. We were provided City Hall 2018 monthly consumption and peak demand for which are shown in Table 3 and Table 4.

Annual electrical consumption for the building was approximately 574,560 kWh. Based on the 2019 LGS rates City Hall annual electrical energy cost is about \$34,818.

Month	Consumption (kWh)	Consumption Charges	Consumption Charges with GST
January	54,240	\$3,287	\$3,451
February	50,880	\$3,083	\$3,237
March	45,600	\$2,763	\$2,902
April	40,800	\$2,472	\$2,596
May	46,560	\$2,822	\$2,963
June	44,160	\$2,676	\$2,810
July	52,800	\$3,200	\$3,360
August	47,520	\$2,880	\$3,024
September	48,960	\$2,967	\$3,115
October	41,040	\$2,487	\$2,611
November	47,760	\$2,894	\$3,039
December	54,240	\$3,287	\$3,451
TOTAL	574,560	\$34,818	\$36,559

Table 3: City Hall 2018 Monthly Consumption

Monthly demand peaks are in the range 53 – 156 kW with resulting demand charges \$654 - \$1925. Highest demand peaks were May through Aug due to space cooling.

Month – Date - Year	Peak Demand (kW)	Demand Charges	Charges with GST
February 21, 2018	122	\$1505	\$1,581
March 13, 2018	109	\$1345	\$1,412
May 7, 2018	117	\$1444	\$1,516
May 24, 2018	137	\$1691	\$1,775
June 20, 2018	149	\$1839	\$1,931
July 30, 2018	156	\$1925	\$2,021
August 9, 2018	154	\$1900	\$1,995
September 27, 2018	55	\$679	\$713
October 23, 2018	107	\$1320	\$1,386
December 3, 2018	53	\$654	\$687

Table 4: City Hall 2018 (February - December) Peak Demand

2.5 City Hall Solar PV Harvests and Energy/Demand Impacts

Based on solar access measurements and local insolation levels (NRCAN Municipal Insolation database), south facing City Hall roof sections could be conservatively expected to harvest in the order of 1160 kWh/year for each 1 kWp of solar PV installed.

Projected solar energy harvests per year, 2019 value of these harvests, and BC Hydro consumption reduction for the building are summarized in

Table 5 for solar PV system sizes discussed in section 2.2 and shown in Figure 14.

Note that value of harvested solar PV energy will increase with any future BC Hydro rate increases.

Location & PV System Size	Energy Harvest (kWh/yr)	Energy Savings (\$/yr) at 2019 Rates + GST	BC Hydro Consumption Reduction
North Roof - Section 1 (23 kWp)	26,680	\$1698	5%
North Roof - Section 2 (27.7 kWp)	32,132	\$2045	6%
South Roof – Section 3 (12.8 kWp)	14,848	\$945	3%
South Roof – Section 4 (31.4 kWp)	36,424	\$2318	6%
South Roof – Section 5 (36 kWp)	41,760	\$2657	7%
MDC Limit – (108 kWp/90 kWAC)	125,280	\$7972	22%

Table 5: City Hall Solar Harvests, Energy Savings and Consumption Impacts

Building peak demand and associated charges are significant May-Sep; months during which solar PV works best at our latitude. These are almost certainly due to space cooling load which tends to peak late afternoon, while solar PV generation tends to peak mid day. Particularly with a larger PV system, solar might assist in shaving late afternoon cooling demand peaks; further increasing savings. For example, peak shaving of 10 kW monthly May-Sep would save an additional \$648 (after tax) annually.

Since BC Hydro metering logs date but not time-of-day of monthly demand peaks, solar PV related peak shaving benefits cannot be predicted with confidence. Intentional peak shaving with PV systems requires battery storage be incorporated to allow intentional dispatching of stored solar energy in real time as demand peaks occur.

2.6 City Hall Solar PV Installations Budget Costing

Approximate installed budget costing for selected City Hall PV systems is summarized in

Table 6. Note that solar PV systems are PST exempt in BC.

PV System Size and Location	Budget Installation Cost (Excluding Taxes)
Rooftop 4 kWp Demonstration System	\$10,600 (\$2.65/Watt)
Rooftop 10 kWp Demonstration System	\$24,000 (\$2.40/Watt)
Rooftop 36 kWp	\$82,800 (\$2.30/Watt)
Rooftop 108 kWp	\$221,400 (\$2.05/Watt)
Patio Canopy 9 kWp Demonstration System	\$31,500 (\$3.50/Watt)
Patio Canopies 19.5 kWp	\$67,275 (\$3.45/Watt)
Parking Shelter 20 kWp	\$75,000 (\$3.75/Watt)

Table 6: Approximate Installed Costing for Selected City Hall Solar PV Systems

2.7 City Hall Solar PV Feasibility Conclusions

Rooftop array locations will provide excellent performance, initially hosting a smaller demonstration system while ultimately accommodating about 108 kWp PV maximum capacity in the future. With the BC Hydro LGS Rate 1600 applying, energy is valued at \$0.0606/kWh; much less than SGS Rate 1300 (\$0.1139/kWh) in force for Fire Hall No. 3 and the Art Centre.

Projected key metrics for a 4 – 10 kWp rooftop demonstration solar PV system include:

- BC Hydro grid energy consumption reduction by 0.8% – 2.0%
- Before tax annual electrical energy cost savings of \$281 - \$703 (at 2019 rates)
- Before tax (GST only) estimated installation costs of \$10,600 - \$24,000

Projected key metrics for an ultimate 108kWp rooftop solar PV system include:

- BC Hydro grid energy consumption reduction by 22%
- Before tax annual electrical energy cost savings of \$7972 (at 2019 rates)
- Before tax (GST only) estimated installation costs of \$221,400

Solar patio canopy and parking shelter options would also be viable as discussed; though at considerably higher cost per watt than roof mounting.

Building electrical infrastructure has capacity to accommodate a 4 – 10 kWp demonstration system using sub-panel 1A (room 138) as the point-of-connection to the grid. In support of simplified future expansion, using MDC (room 004) as the point-of-connection accommodates initial small demonstration systems through to a future ultimate 108kWp rooftop capacity. Projected costs assume roof structures can accommodate the additional deadload associated with ballasted racking systems. A professional structural review is required to verify whether a ballasted racking strategy would be acceptable.

3. Fire Hall No.3

Salmon Arms Fire Hall No.3 is located at 141 Ross Street NE shown in Figure 24. The two flat roof sections have many obstacles (vents, mechanical equipment, antennas, etc) that will restrict placement of solar PV and create undesirable shading. However, solar installation would still be possible in the less congested and more shade-free areas of the roof. More details are given below.



Figure 24: Fire Hall No.3 Building

3.1 Fire hall Solar Photography

We performed solar photography with the Solmetric SunEye 210 at rooftop locations shown in Figure 25 judged to be suitable for solar PV array placement. Significant seasonal variation occurs at North Locations 1 and 2 because of shading by the hose tower roof access structure. Further details are discussed in the next sections. The solar access results are summarized in Table 7.

Location	Annual	Summer	Winter
North Location 1	96%	99%	89%
North Location 2	85%	93%	69%
North Location 3	93%	96%	86%
North Location 4	98%	99%	95%
South	99%	99%	98%

Table 7: Fire Hall No.3 Solar Access Results

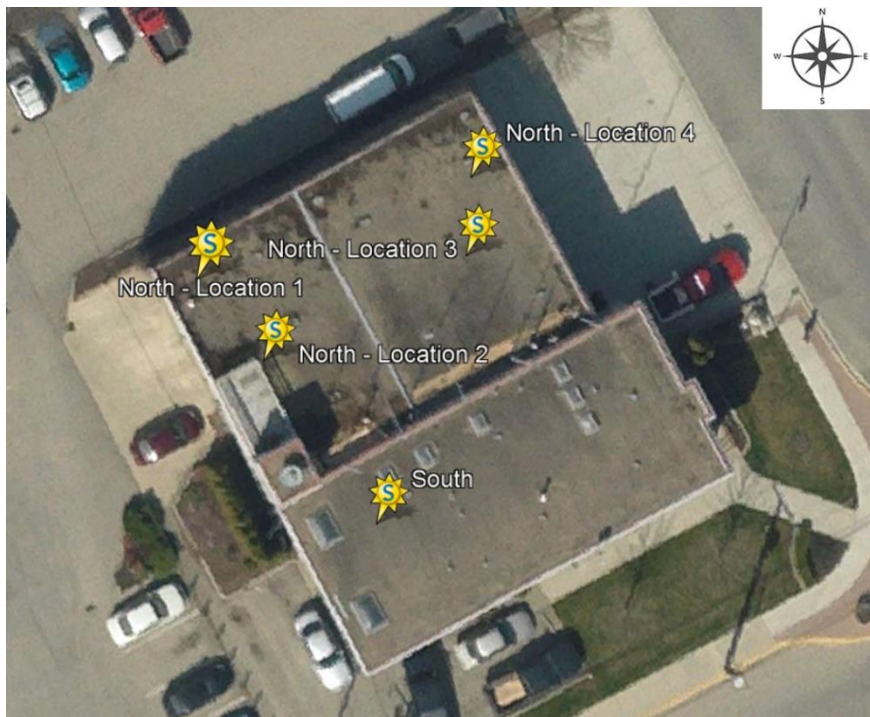


Figure 25: Fire Hall No.3 Building Solar Photography Sites

3.1.1 Fire Hall No.3 – North Location 1

Figure 26 shows the charts for the annual sun paths, monthly solar access and shading obstruction elevation vs. azimuth. Reduction in winter solar access score is due to the shading caused by the nearby roof access and antennas.

Panel Orientation: Tilt=10° -- Azimuth=180° -- **Skyline Heading=180°**

GPS Location: Latitude=50.70092°N -- Longitude=119.28090°W

Solar Access: Annual: 96% -- Summer (May-Oct): 99% -- Winter (Nov-Apr): 89%

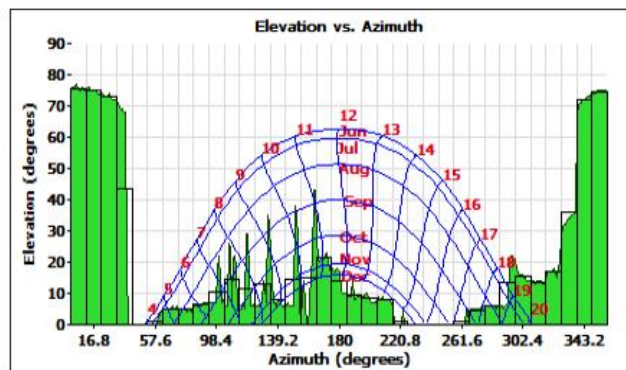
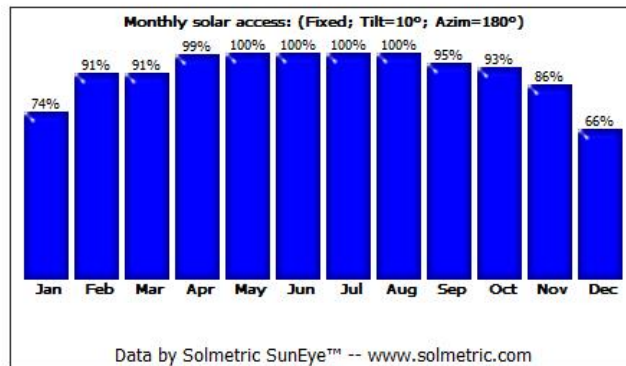
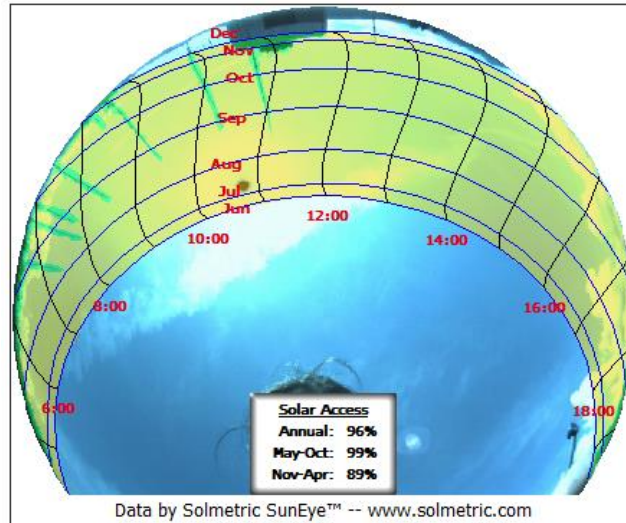


Figure 26: Fire Hall No.3 North Roof Location 1 Solar Access

3.1.2 Fire Hall No.3 – North Location 2

Figure 27 shows the charts for the annual sun paths, monthly solar access and shading obstruction elevation vs. azimuth. Comparing to North Location 1, annual scores are significantly reduced due to winter shading from the roof access structure. We consider this an undesirable solar PV location.

Panel Orientation: Tilt=10° -- Azimuth=180° -- **Skyline Heading=181°**

GPS Location: Latitude=50.70088°N -- Longitude=119.28084°W

Solar Access: Annual: 85% -- Summer (May-Oct): 93% -- Winter (Nov-Apr): 69%

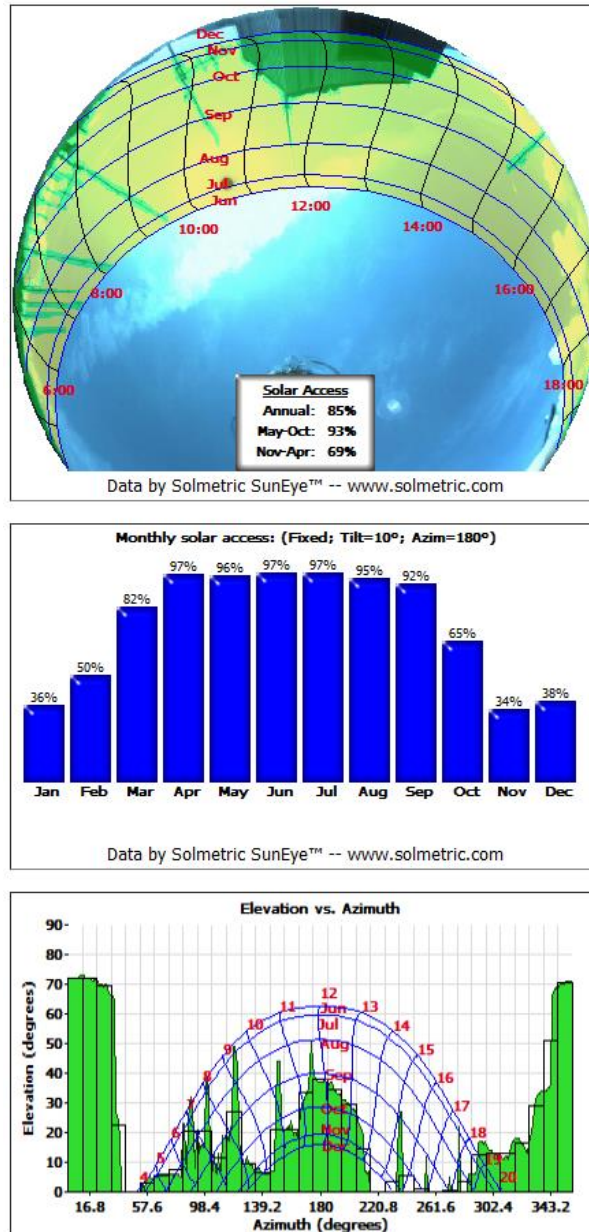


Figure 27: Fire Hall No.3 North Roof Location 2 Solar Access

3.1.3 Fire Hall No.3 – North Location 3

Figure 28 shows the charts for the annual sun paths, monthly solar access and shading obstruction elevation vs. azimuth. Winter solar access score is reduced by nearby antennas; though annual score remains very good.

Panel Orientation: Tilt=10° -- Azimuth=180° -- **Skyline Heading=179°**

GPS Location: Latitude=50.70094°N -- Longitude=119.28068°W

Solar Access: Annual: 93% -- Summer (May-Oct): 96% -- Winter (Nov-Apr): 86%

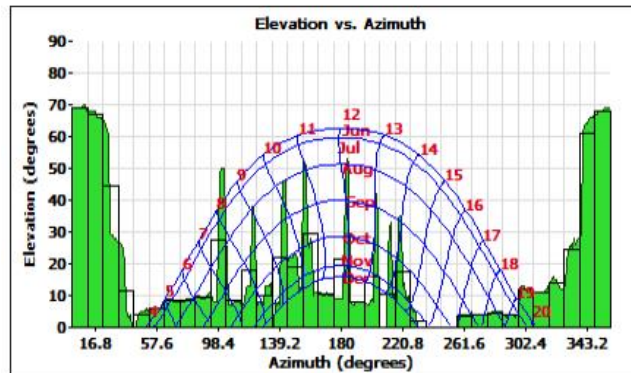
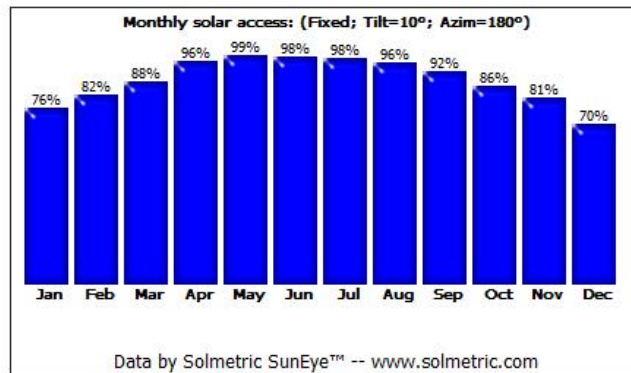
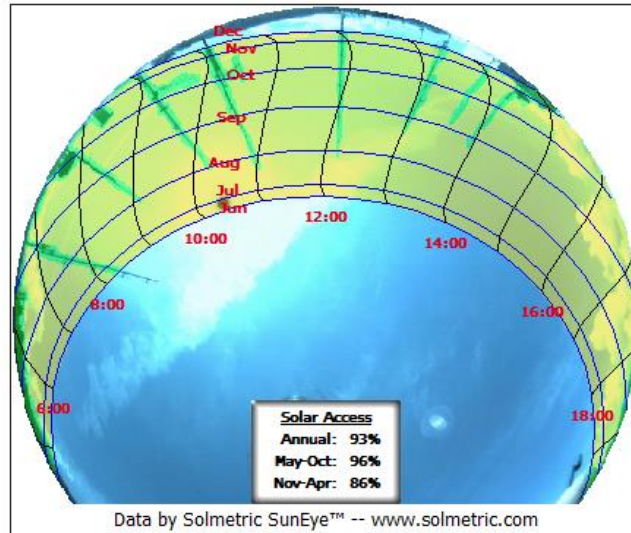


Figure 28: Fire Hall No.3 North Roof Location 3 Solar Access

3.1.4 Fire Hall No. 3 – North Location 4

Figure 29 shows the charts for the annual sun paths, monthly solar access and shading obstruction elevation vs. azimuth. Comparing to North Location 3, scores are improved by increasing distance to nearby antennas; thus reducing their shading impact.

Panel Orientation: Tilt=10° -- Azimuth=180° -- **Skyline Heading=178°**

GPS Location: Latitude=50.70098°N -- Longitude=119.28068°W

Solar Access: Annual: 98% -- Summer (May-Oct): 99% -- Winter (Nov-Apr): 95%

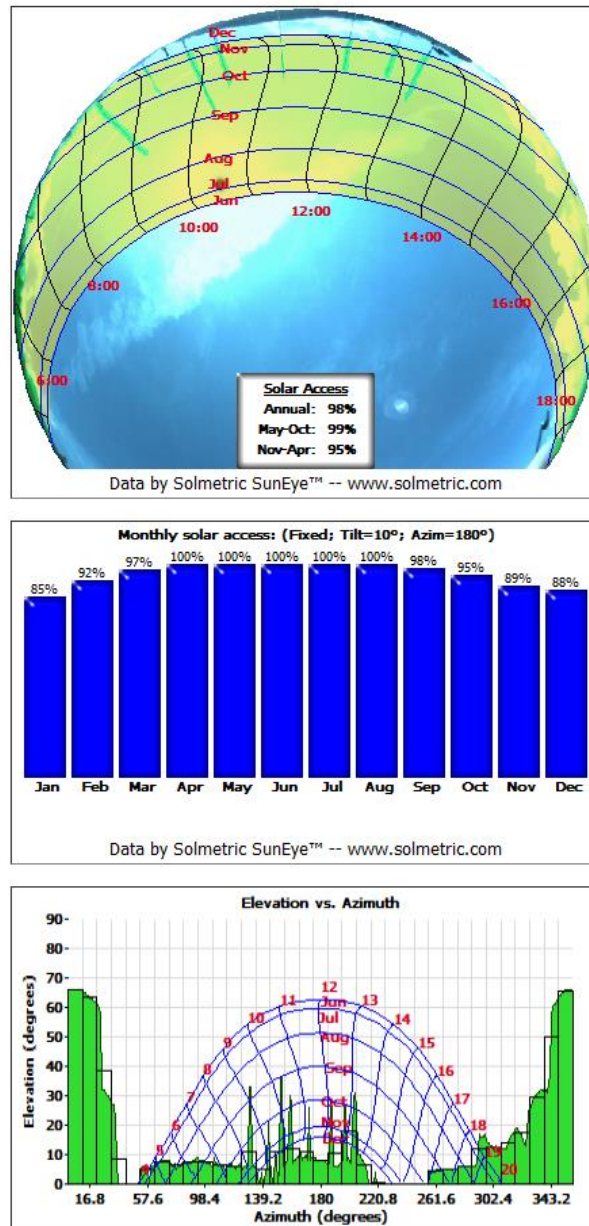


Figure 29: Fire Hall No.3 North Roof Location 4 Solar Access

3.1.5 Fire Hall No. 3 – South

Figure 30 shows the charts for the annual sun paths, monthly solar access and shading obstruction elevation vs. azimuth. While scores are excellent, array space is limited.

Panel Orientation: Tilt=10° -- Azimuth=180° -- **Skyline Heading=182°**

GPS Location: Latitude=50.70080°N -- Longitude=119.28074°W

Solar Access: Annual: 99% -- Summer (May-Oct): 99% -- Winter (Nov-Apr): 98%

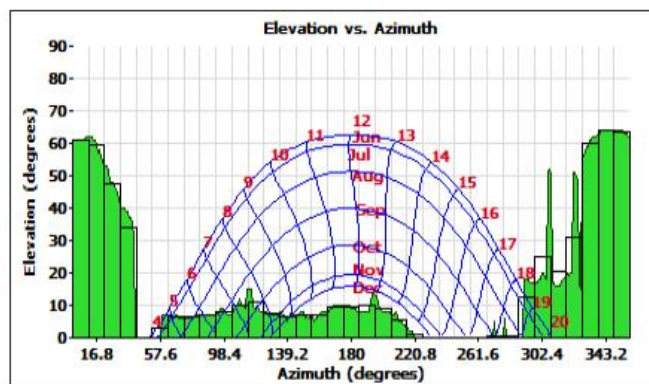
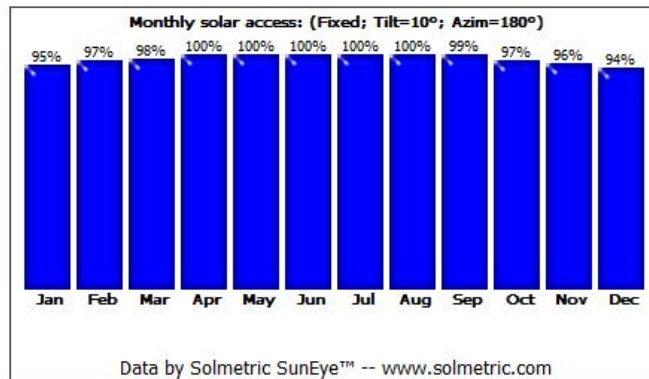
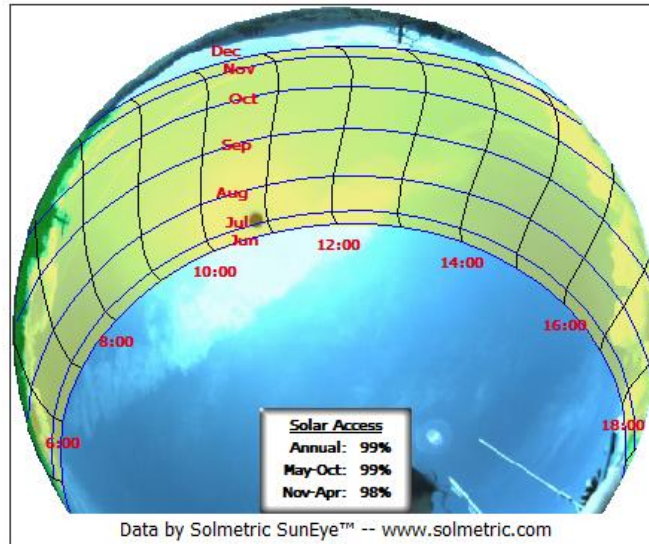


Figure 30: Fire Hall No.3 South Roof Solar Access

3.2 Fire Hall No.3 Array Placement, Sizing, and Mounting Options

Fire Hall No.3 has significant roof obstructions that will limit solar array placement; some of which also cause noteworthy shading. The south roof has excellent shading scores but considerably more constrained placement options than the north roof.

Figure 31 shows north roof obstructions which include antennas, roof access and vents. Solar photography shows north locations 3 and 4 to be the best placement choice for demonstration systems 4 – 10 kWp. Usable south roof space limits system size to in the order of 3.6 kWp.

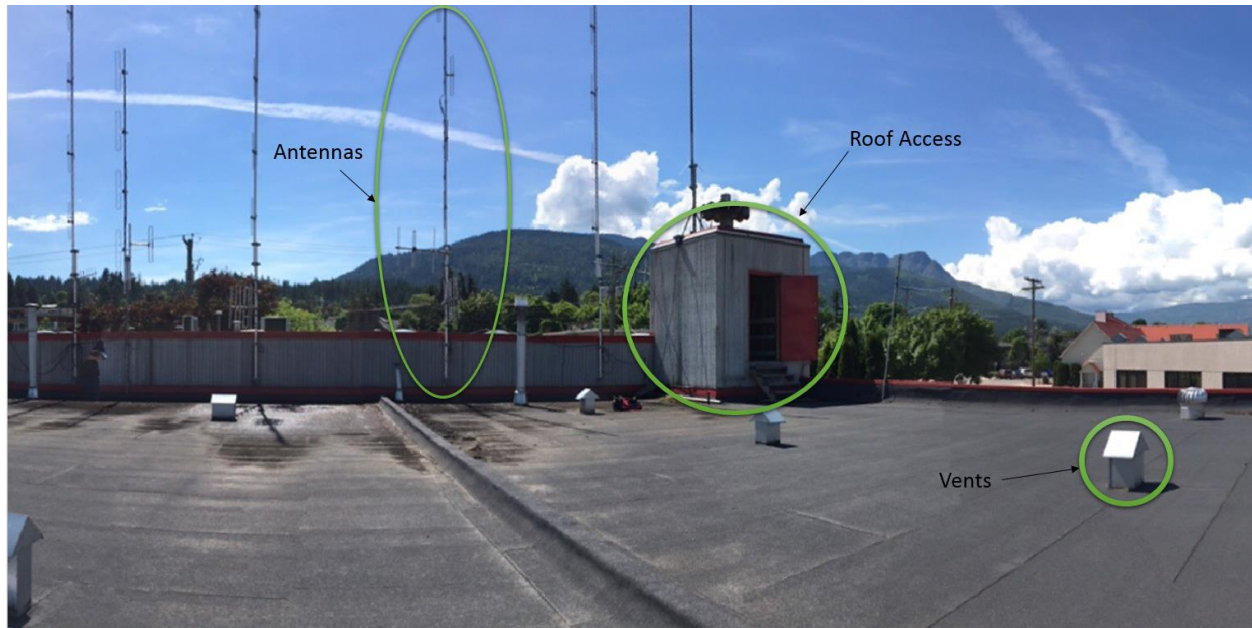


Figure 31: Fire Hall No.3 North Roof Obstructions

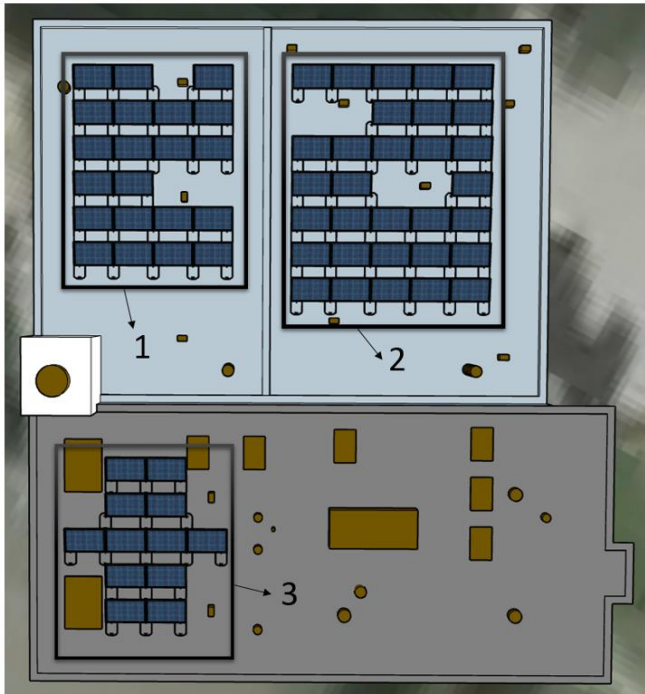
Figure 32 shows obstructions which include skylights, vents, and heat exchangers that significantly limit PV array placement and size on the south roof.



Figure 32: Fire Hall No.3 South Roof Obstructions

The roofs are flat and finished with SBS torch on material which is significantly older in appearance than city hall. Retrofitting solar PV to Fire Hall No. 3 would be most easily done with ballasted racking provided the roof structure can safely manage the additional load. See Appendix A for examples of solar PV installations using ballasted racking.

Based on our site measurements and approximate rooftop models, the fire hall roof can accommodate about 64 solar PV modules (60 cell type) in 3 sub-array sections as shown in Figure 33. Array power capacities are based on 300 W solar modules.



Section #	# of Solar Panels	Total Power (KWp)
1	21	6.3
2	31	9.3
3	12	3.6
TOTAL	64	19.2

Figure 33: Fire Hall No.3 Rooftop Solar PV Array Placements and Capacities

Due to shading constraints, section 1 will be the least desirable. For demonstration systems 4 – 10 kWp we suggest section 2 as the best starting option, keeping modules as far north of the antennas as possible to minimize shading impacts. Expansion into sections 1 and 3 could be considered in future for up to 19.2 kWp ultimate capacity.

3.3 Fire Hall No.3 Solar Electrical Review

Electrical drawings were not available. An approximate electrical single line drawing based on our inspection is shown in Figure 34.

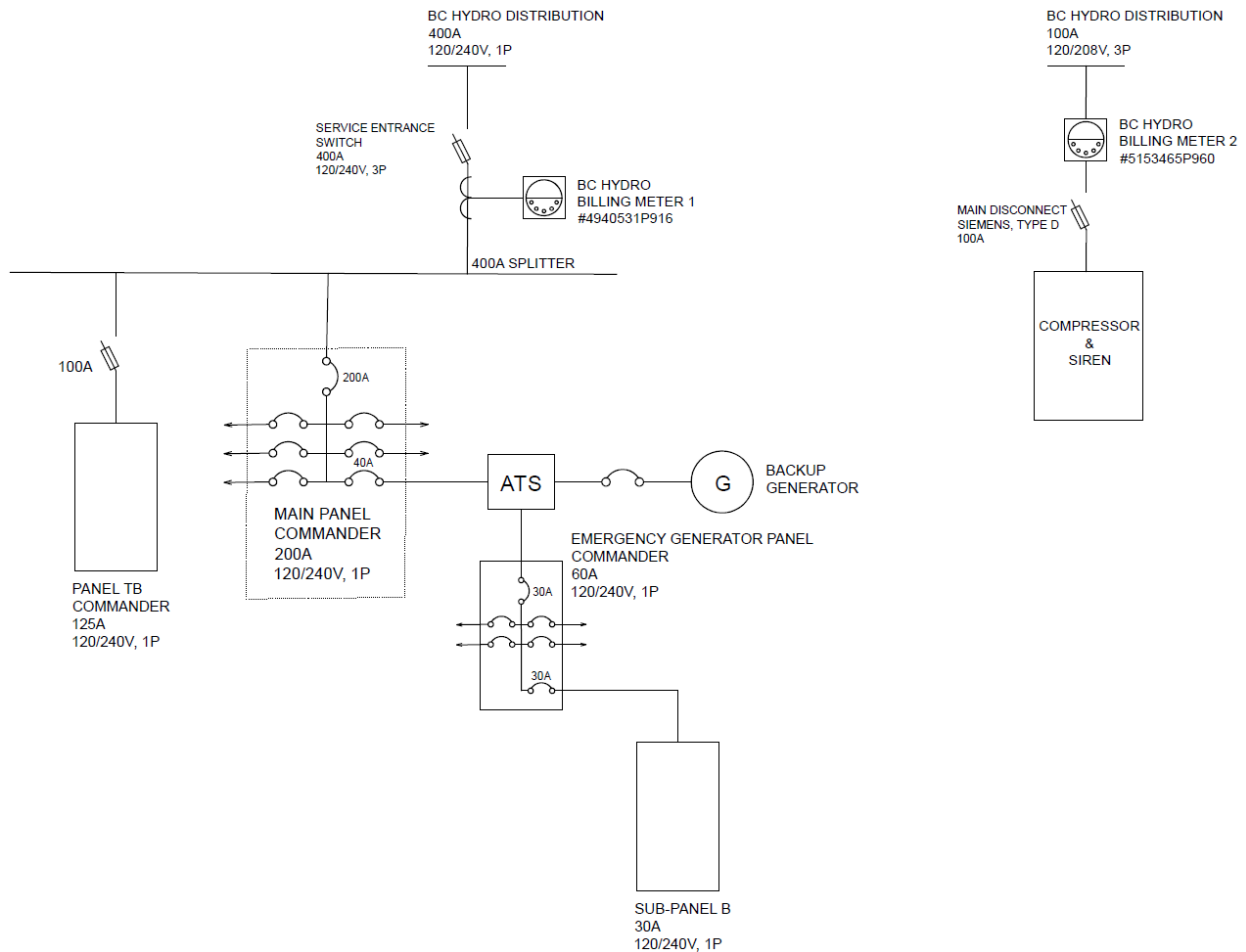


Figure 34: Fire Hall No. 3 Approximate Electrical Single Line Diagram

The building is supplied by two separate BC Hydro services. The main service is 120/240VAC, single phase, 400A via meter 1; supplying the main panel located in the electrical room and the truck bay panel (TB) as shown in Figure 35. The 2nd service via BC Hydro meter 2, is 120/208VAC, 3-phase, 100A and supplies compressor and siren systems as shown in Figure 36.

Table 8 summarizes locations and meter serial numbers for each of the billing meters.

BC Hydro Meter	Location	Serial Number
1	Main electrical room	4940531P916
2	Truck bay for compressor and siren	5153465P960

Table 8: Fire Hall BC Hydro Meter Information

An Automatic Transfer Switch (ATS) in the main electrical room maintains supply to the Emergency Panel via an outdoor backup generator in the case of BC Hydro outages. The Emergency Panel should be avoided as a solar PV point-of-connection as grid-dependent solar PV inverters are not intended for parallel operation with backup generation.

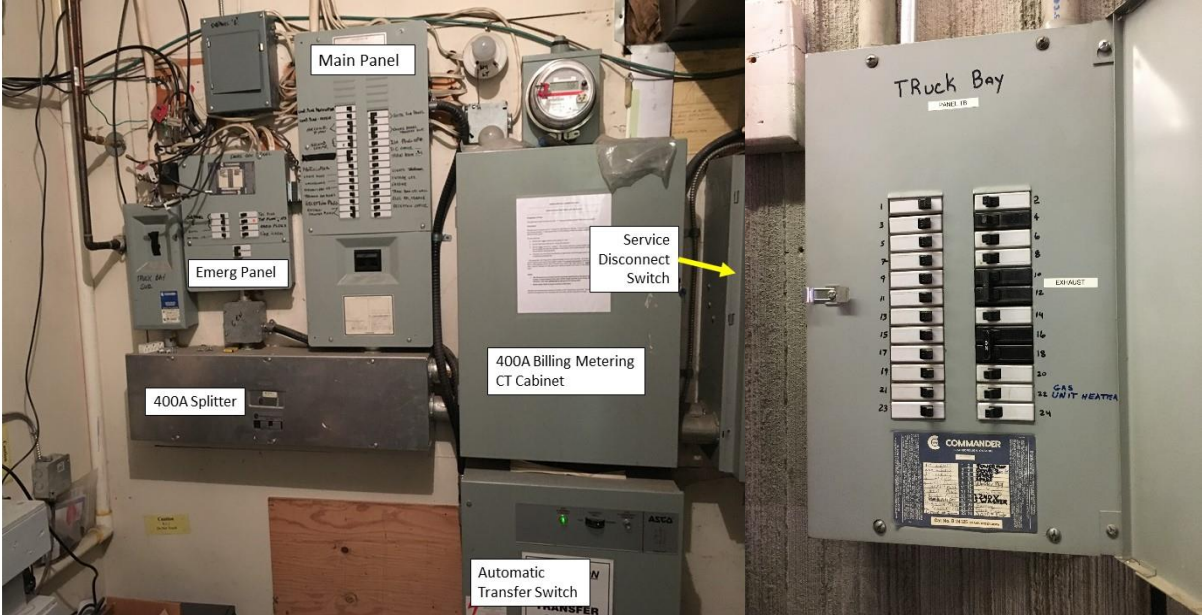


Figure 35: Fire Hall Single Phase Main Service and Sub-Panel TB

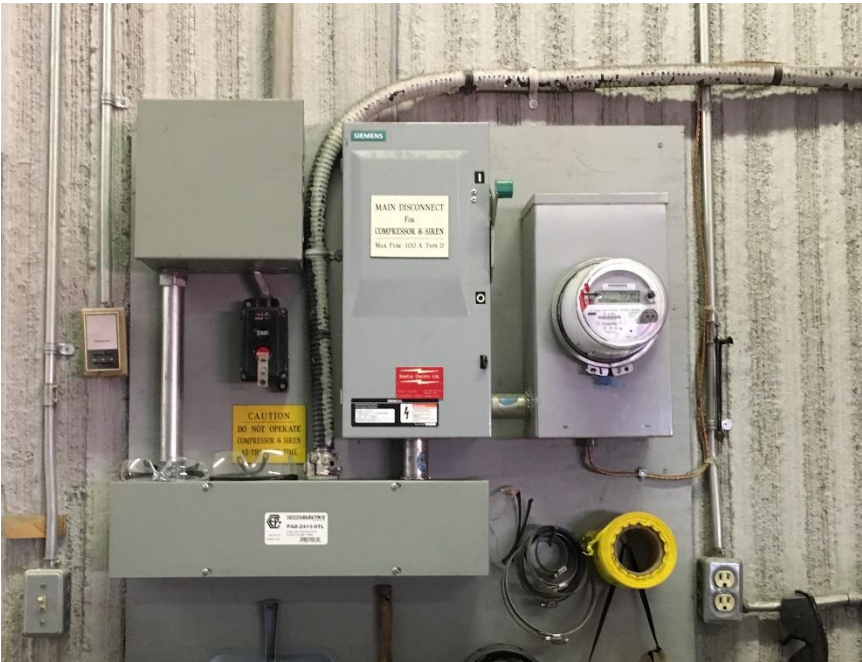


Figure 36: Fire Hall 3-Phase Service

Only the single-phase service is acceptable as a solar PV point-of-connection under the BC Hydro Net-Metering program as the 3-phase service is much too lightly loaded. Based on panel locations, bus capacities, CEC Section 64 requirements, and cable access to rooftop arrays, the 400 Amp splitter in the main electrical room is presently the most viable point-of-connection for a demonstration system 4 -10 kWp or a future ultimate 19.2 kWp system. By upgrading to a 200 Amp version, panel TB in the truck bay could also be suitable for a demonstration system. Cable routing to the rooftop would be simplified if the hose tower could be used for this purpose.

3.4 Fire Hall No.3 Electrical Consumption

BC Hydro provides single-phase service (via meter 1 #4940531P916) and 3-phase service (via meter 2 #5153465P960) to the building under the Small General Service (SGS) Rate 1300; energy charges of \$0.1139/kWh at time of writing.

We were provided monthly consumption information for 2018 which is shown in Table 9 for meter 1 and Table 10 for meter 2. Meter 1 electrical consumption was approximately 36,060 kWh in 2018; a \$4,107 cost before taxes at present rates. Meter 2 consumption was on the other hand only 305 kWh in 2018; a \$34 cost before taxes.

Bi-Monthly	Consumption (kWh)	Consumption Charges	Consumption Charges with GST
January	6,780	\$722	\$811
March	5,760	\$656	\$689
May	5,460	\$622	\$653
July	6,060	\$690	\$725
September	6,360	\$724	\$761
November	5,640	\$642	\$675
TOTAL	36,060	\$4107	\$4313

Table 9: Fire Hall 2018 Monthly Consumption for Meter 1

Bi-Monthly	Consumption (kWh)	Consumption Charges	Consumption Charges with GST
January	55	\$6.26	\$6.58
March	44	\$5.01	\$5.26
May	41	\$4.67	\$4.90
July	76	\$8.66	\$9.09
September	47	\$5.35	\$5.62
November	42	\$4.78	\$5.02
TOTAL	305	\$34.74	\$36.48

Table 10: Fire Hall 2018 Monthly Consumption for Meter 2

3.5 Fire Hall No.3 Solar PV Harvests and Energy Impacts

Based on solar access measurements and local insolation levels, south facing Fire Hall roof sections could be conservatively expected to harvest in the order of 1160 kWh/year for each 1 kWp of solar PV installed.

Projected solar energy harvests per year, present value of these harvests, and the impacts on BC Hydro consumption for the single-phase service (meter 1) are summarized in Table 11 for example demonstration systems (4 – 10 kWp) using roof sections discussed in section 3.2 (Figure 33). Note that the value of harvested solar PV energy will increase with BC Hydro rate increases.

Location & PV System Size	Energy Harvest (kWh/yr)	Energy Savings (\$/yr) at 2019 Rates + GST	BC Hydro Consumption Reduction - Meter 1
North Roof - Section 2 (4.2 kWp)	4,872	\$583	13%
North Roof - Section 2 (9.3 kWp)	10,788	\$1290	30%
North Roof – Section 2 and 1 Partial (10.2 kWp)	11,832	\$1415	33%
Maximum Rooftop 19.2 kWp	22,272	\$2664	62%

Table 11: Fire Hall Solar Harvests, Energy Savings and Consumption Impacts

3.6 Fire Hall No.3 Solar PV Installations Budget Costing

Approximate installed budget costing for example Fire Hall No. 3 PV demonstration systems 4 – 10 kWp systems and ultimate capacity is summarized in Table 12. Note that solar PV systems are PST exempt in BC.

PV System Size and Location	Budget Installation Cost (Excluding Taxes)
North Roof - Section 2 (4.2 kWp)	\$11,130 (\$2.65/Watt)
North Roof - Section 2 (9.3 kWp)	\$22,320 (\$2.40/Watt)
North Roof – Section 2 and 1 Partial (10.2 kWp)	\$24,480 (\$2.40/Watt)
Maximum Rooftop 19.2 kWp	\$45,120 (\$2.35/Watt)

Table 12: Approximate Installed Costing for Selected Fire Hall No. 3 Solar PV Systems

3.7 Fire Hall No.3 Solar PV Feasibility Conclusions

Rooftop array placement choice is quite constrained by physical obstacles (south roof in particular) and shading in the case of the north roof. None-the-less well performing demonstration systems (4 – 10 kWp) could be accommodated on the north roof using section 2 first followed by northmost portions of section 1. Future expansion up to 19.2 kWp would be possible using all available roof sections. With the BC Hydro SGS Rate 1300 applying, energy is valued at \$0.1139/kWh; making the business case for solar PV more attractive than city hall.

Projected key metrics for a 4.2 – 10.2 kWp rooftop demonstration solar PV system include:

- BC Hydro grid energy consumption reduction by 13% – 33%
- After-tax annual electrical energy cost savings of \$583 - \$1415 (at 2019 rates)
- Before tax (GST only) estimated installation costs of \$11,130 - \$24,480

Projected key metrics for an ultimate 19.2 kWp rooftop solar PV system include:

- BC Hydro grid energy consumption reduction by 62%
- Before tax annual electrical energy cost savings of \$2664 (at 2019 rates)
- Before tax (GST only) estimated installation costs of \$45,120

Building electrical infrastructure has capacity to accommodate a 4.2 – 10.2 kWp demonstration system on the single-phase service (meter 1) using the 400A splitter in the main electrical room as the point-of-connection to the grid. Sub-panel TB could alternately be used if first upgraded to 200A bus capacity. Either point-of-connection would be suitable for future expansion to the maximum roof 19.2 kWp configuration.

Projected costs assume roof structures can accommodate the additional deadload associated with ballasted racking systems. A professional structural review is required to verify whether a ballasted racking strategy would be acceptable.

4. Arts Centre

Salmon Arm Arts centre is located at 70 Hudson Avenue NE shown in Figure 37. The roof has various obstacles restricting array placement but a demonstration solar PV installation 4 – 10 kWp will still be possible in the less congested areas. The Arts centre also has nearby trees, buildings and chimney causing some shading that will need to be carefully considered in the installation. More details are given below.



Figure 37: Arts Centre Building

4.1 Art Centre Solar Photography

Solar photography was done with the Solmetric SunEye 210 on various locations of the roof shown in Figure 38 where we felt array placement could be feasible.

The solar access results for each location are summarized in Table 13. Most locations have excellent solar access scores other than South Roof Location 1 which is significantly shaded by a deciduous tree along the south-west side of the building. Further details on solar access and shading obstructions are given in the next sections.



Figure 38: Arts Centre Building Solar Photography Sites

Location	Annual	Summer	Winter
North Location 1	96%	97%	92%
North Location 2	97%	99%	92%
South Location 1	86%	94%	68%
South Location 2	95%	99%	86%

Table 13: Arts Centre Solar Access Results

4.1.1 Art Centre – North Location 1

Figure 39 shows the charts for the annual sun paths, monthly solar access and shading obstruction elevation vs. azimuth.

Panel Orientation: Tilt=10° -- Azimuth=180° -- **Skyline Heading=185°**

GPS Location: Latitude=50.70066°N -- Longitude=119.28426°W

Solar Access: Annual: 96% -- Summer (May-Oct): 97% -- Winter (Nov-Apr): 92%

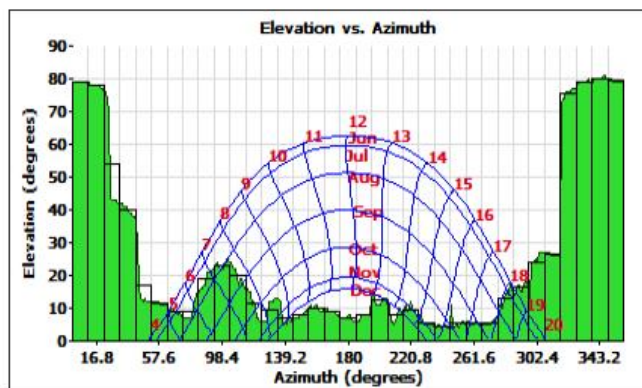
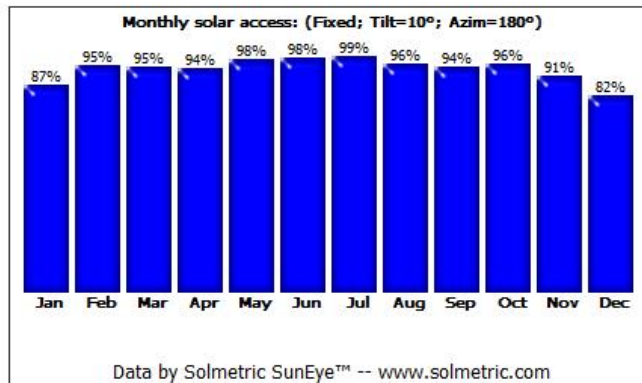
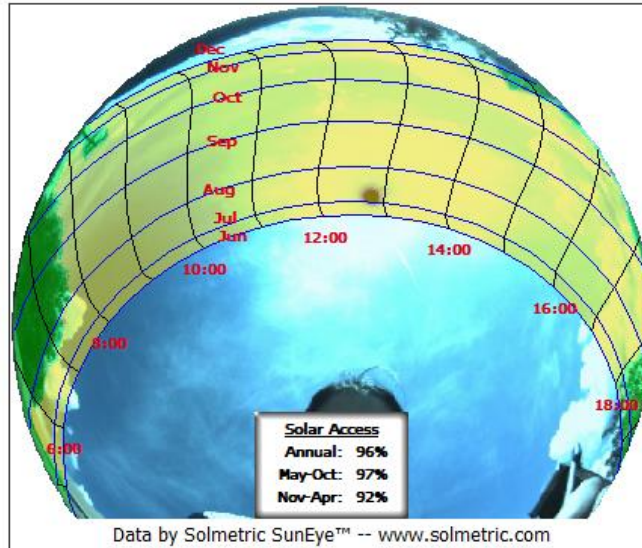


Figure 39: Art Centre North Roof Location 1 Solar Access

4.1.2 Art centre – North Location 2

Figure 40 shows the charts for the annual sun paths, monthly solar access and shading obstruction elevation vs. azimuth.

Panel Orientation: Tilt=10° -- Azimuth=180° -- **Skyline Heading=187°**

GPS Location: Latitude=50.70070°N -- Longitude=119.28428°W

Solar Access: Annual: 97% -- Summer (May-Oct): 99% -- Winter (Nov-Apr): 92%

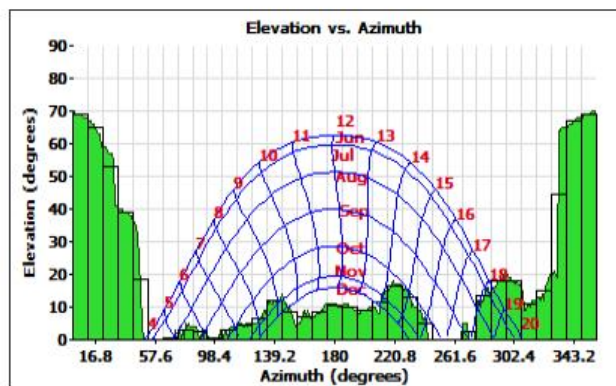
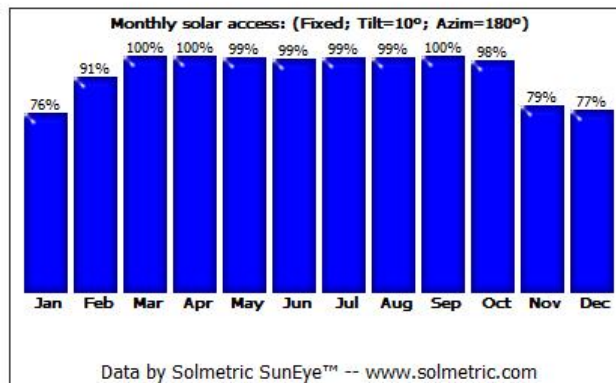
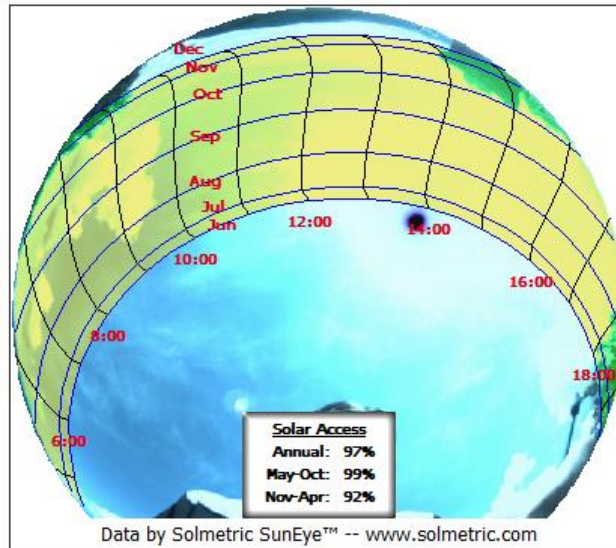


Figure 40: Art Centre North Roof Location 2

4.1.3 Art Centre – South Location 1

Figure 41 shows the charts for the annual sun paths, monthly solar access and shading obstruction elevation vs. azimuth. Significant shading by the deciduous tree directly southwest presently reduces solar access scores.

Panel Orientation: Tilt=10° -- Azimuth=180° -- **Skyline Heading=175°**

GPS Location: Latitude=50.70060°N -- Longitude=119.28432°W

Solar Access: Annual: 86% -- Summer (May-Oct): 94% -- Winter (Nov-Apr): 68%

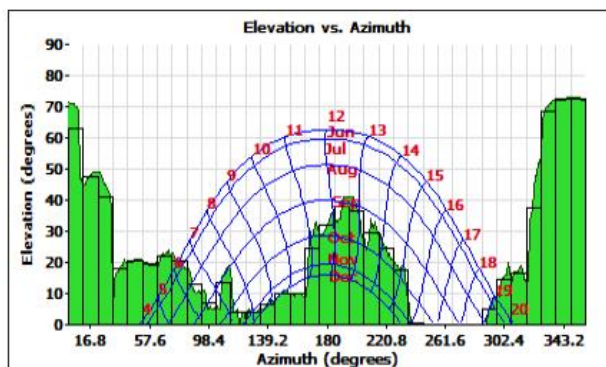
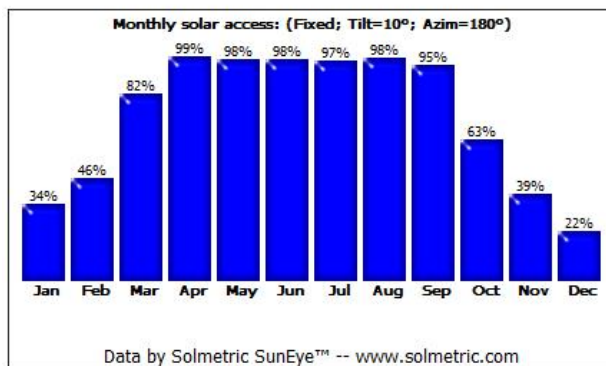
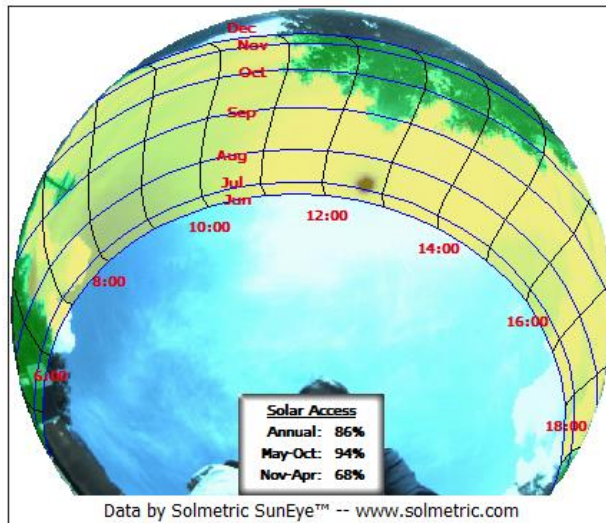


Figure 41: Art Centre South Roof Location 1 Solar Access

Selective topping or removal of the shade tree is possible, would dramatically improve solar access scores for South Location 1 as shown in Figure 42.

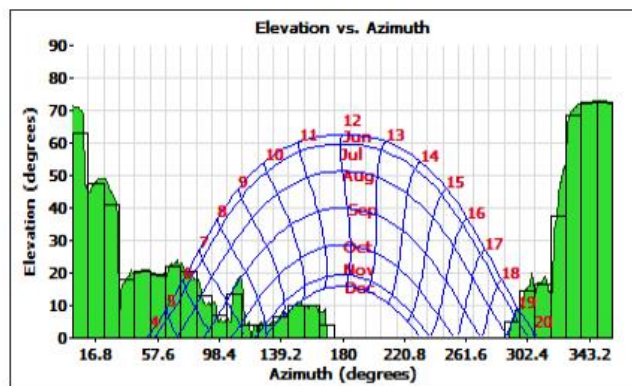
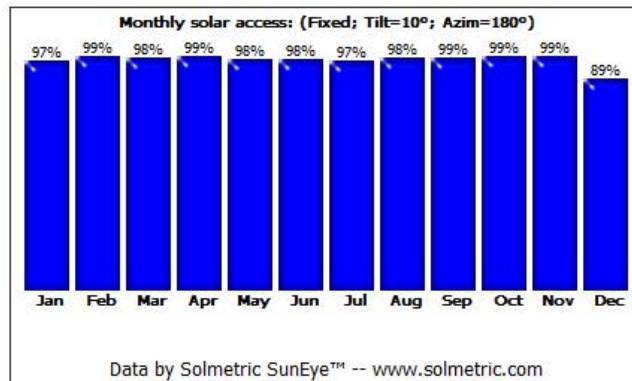
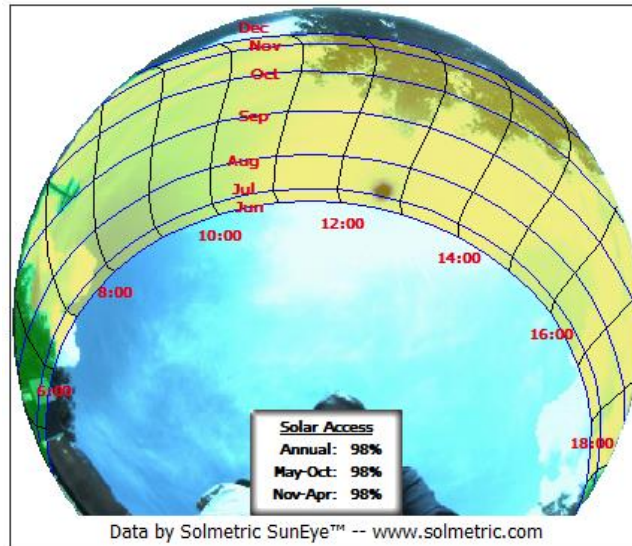


Figure 42: Art Centre South Roof Location 1 with Tree Shading Removed

4.1.4 Art Centre – South Location 2

shows the charts for the annual sun paths, monthly solar access and shading obstruction elevation vs. azimuth. The building to the south-west reduces solar access during the winter months, but a very good 95% annual score still results.

Panel Orientation: Tilt=10° -- Azimuth=180° -- **Skyline Heading=177°**

GPS Location: Latitude=50.70060°N -- Longitude=119.28439°W

Solar Access: Annual: 95% -- Summer (May-Oct): 99% -- Winter (Nov-Apr): 86%

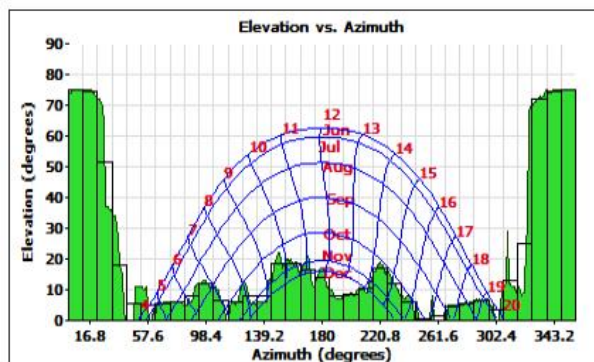
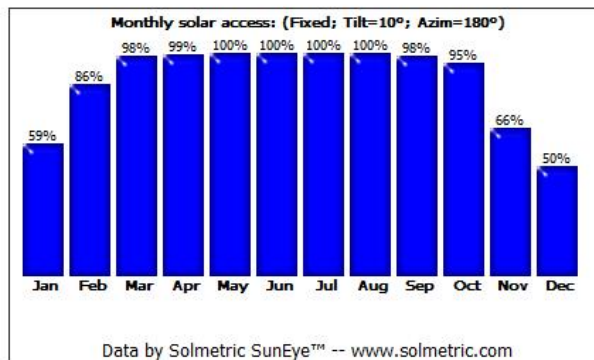
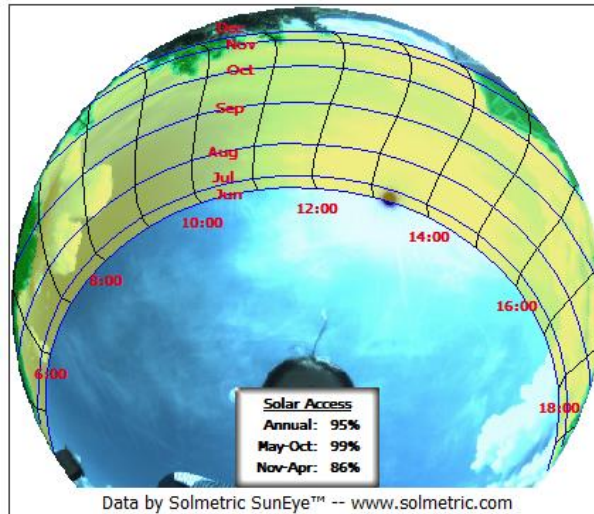


Figure 43: Art Centre South Roof Location 2 Solar Access

4.2 Art Centre Array Placement, Sizing, and Mounting Options

Both north and south roof sections have obstacles solar array placement will need to be designed around. Figure 44 shows the north roof section with key obstructions including air handler and roof access hatch. Small roof drains may be worked around.

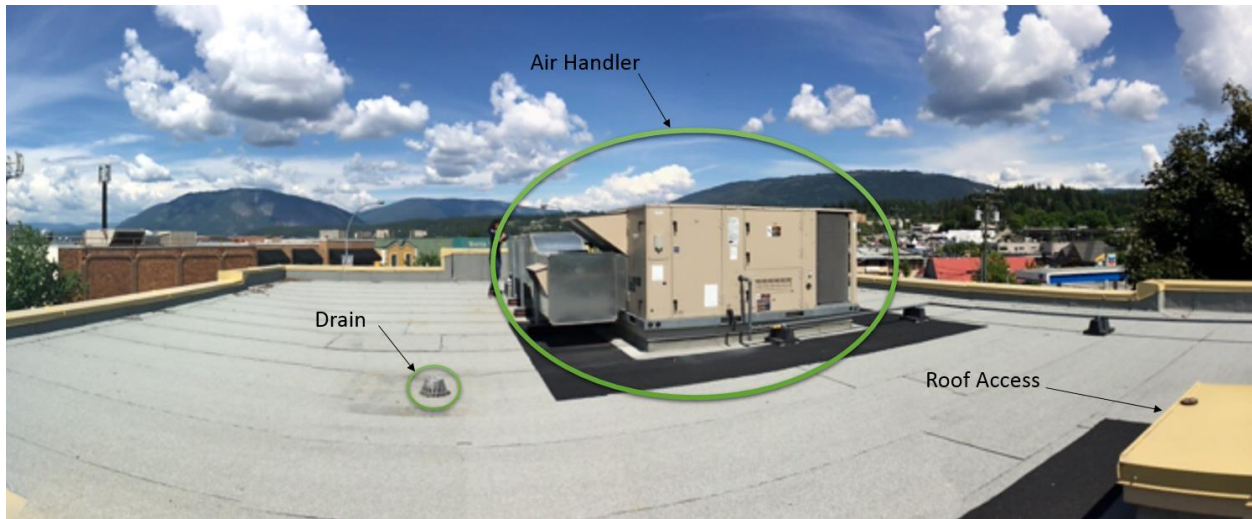


Figure 44: Art Centre North Roof Obstructions

Figure 45 shows the tree and building which cause south roof shading as discussed in the previous section. The chimney would also cause undesirable shading if north roof solar modules were placed too close to it.



Figure 45: Art Centre South West Roof Shading Obstructions

Both north and south roofs are finished with SBS torch on membrane, with the north roof apparently having been replaced quite recently. Retrofitting solar PV to the Art Centre roof tops would be most easily done with ballasted racking provided the roof structure can safely manage the additional load. See Appendix A for examples of solar PV installations using ballasted racking.

The maximum solar PV array capacity we feel could fit the Arts Centre roof respecting maintenance clearances and shading constraints is shown in Figure 46, along with sub-array capacities based on 300W 60 cell solar modules.



Section #	# of Solar Panels	Total Power (KWp)
1	17	5.1
2	17	5.1
TOTAL	34	10.2

Figure 46: Arts Centre Breakdown of Solar PV Array

Another option to consider is a solar parking shelter (9.6 kWp shown) at the south wall as in Figure 47, which could be free standing or partially supported by the building. The parking shelter could be associated with an EV charging station if desired. Removal of the tree presently shading the south roof would be necessary.

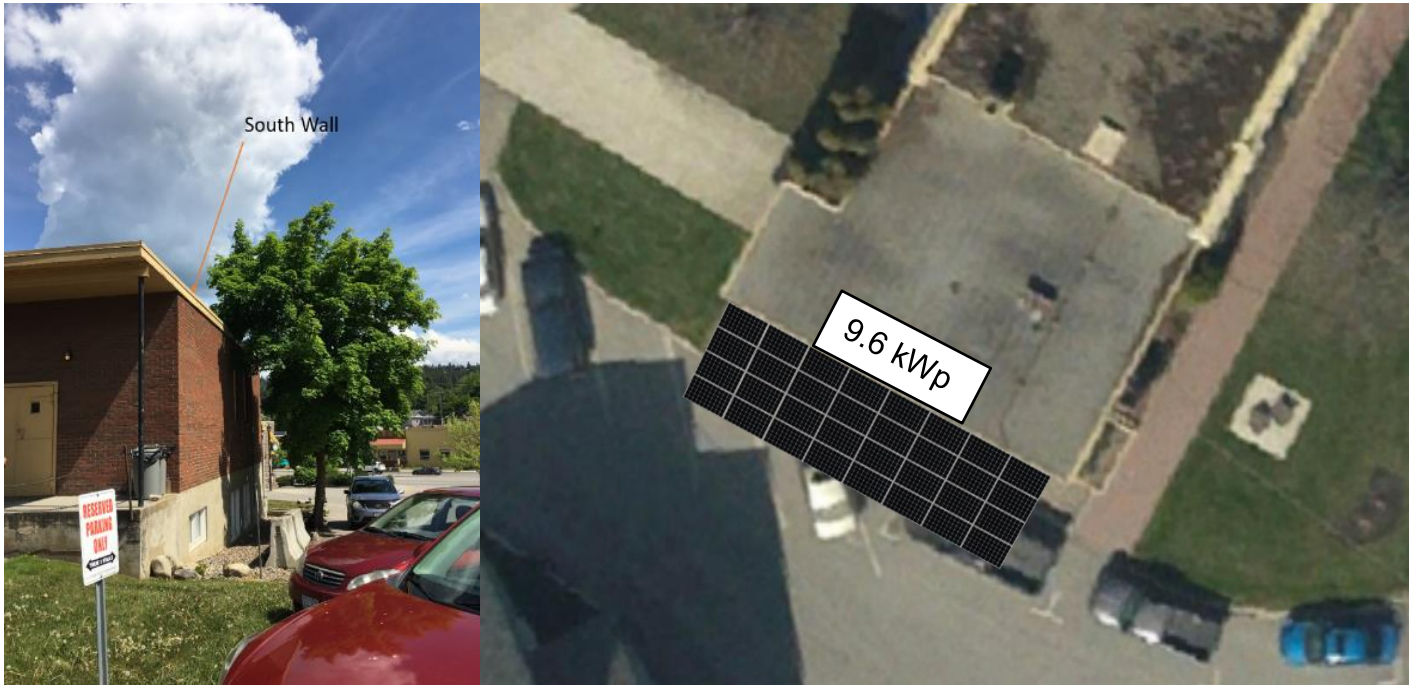


Figure 47: Art Centre South Wall Solar Parking Shelter Concept

4.3 Art Centre Solar Electrical Review

Electrical drawings were not available. By inspection we deduced the electrical single line in . The building has a 120/208V, 3-phase, 200A main service from BC Hydro. Supply is distributed through the building using a 200A Siemens main panel located in a downstairs closet, which also sub-feeds panel A on the upper floor.

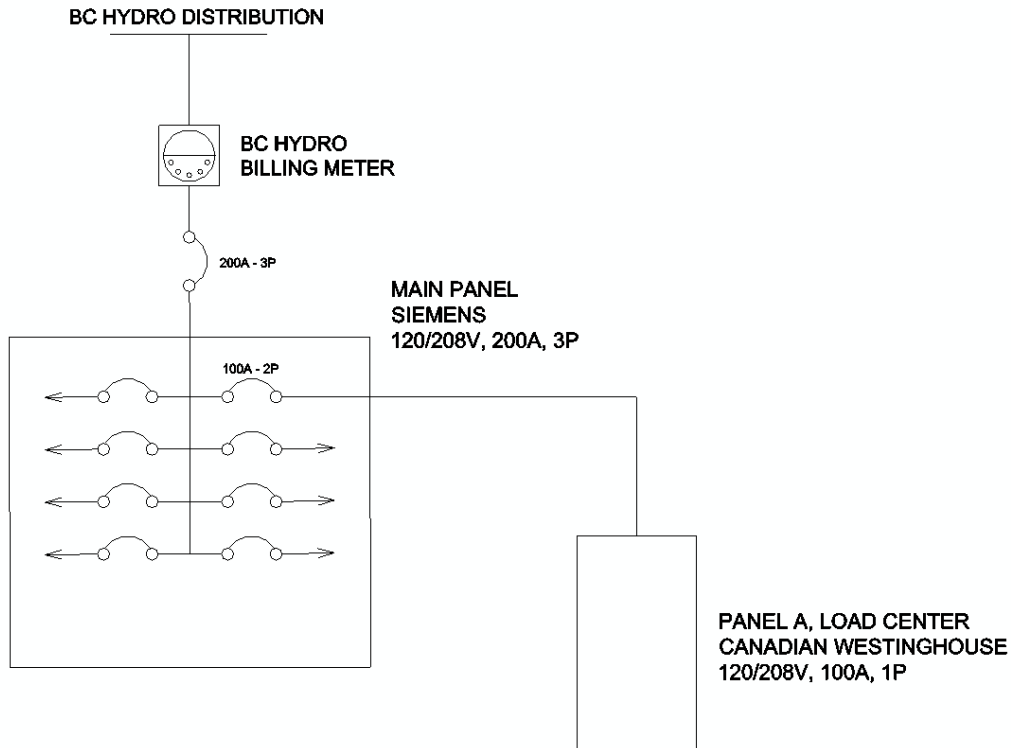


Figure 48: Arts Centre Electrical Single Line

As shown in Figure 49, both panels are full with no additional circuit breaker space. To provide a CEC Section 64 compliant solar PV point-of-connection to the grid we would recommend one of the following minor service modifications:

- If PV systems larger than 10 kW_{AC} will never be installed, space for a 30 A – 3P solar PV breaker must be created in the main panel; by combining circuits, using piggy-back breakers, or replacing the panel.
- To allow for possible future PV systems capacity exceeding 10kW_{AC}, a 400 A service splitter could be added, into which the solar PV system would connect.



Figure 49: Art Centre Main and Sub Panels – No Spare Breaker Positions

4.4 Art Centre Electrical Consumption

BC Hydro provides service to the building under the Small General Service (SGS) Rate 1300. We were provided the monthly consumption information for 2018 shown in Table 14. Annual electrical consumption for the building was approximately 22,334 kWh in 2018. At the time of writing Rate 1300 electrical energy charge is \$0.1173 per kWh so annual consumption has a value of \$2,620 before tax.

Month - 2018	Consumption (kWh)
January	1,553
February	1,830
March	1,753
April	1,828
May	1,855
June	1,894
July	2,543
August	2,128
September	1,569
October	2,125
November	1,762
December	1,404
TOTAL	22,334

Table 14: Arts Centre 2018 Monthly Consumption

4.5 Art Centre Solar PV Harvests and Energy Impacts

Based on solar access measurements and local insolation levels, south facing Art Centre roof sections could be conservatively expected to harvest in the order of 1160 kWh/year for each 1 kWp of solar PV installed if roof shading with careful placement.

Projected solar energy harvests per year, present value of these harvests, and the impacts on BC Hydro consumption for the building are summarized in Table 15 for the solar PV System sizes discussed in section 4.2. Note that the value of harvested solar PV energy will increase with BC Hydro rate increases.

Location & PV System Size	Energy Harvest (kWh/yr)	Energy Savings (\$/yr) at 2019 Rates + GST	BC Hydro Consumption Reduction
North Roof - Section 1 (5.1 kWp)	5,916	\$708	26%
South Roof - Section 2 (5.1 kWp)	5,916	\$708	26%
Both Roofs (10.2 kWp)	11,832	\$1,416	53%
Parking Shelter (9.6 kWp)	11,136	\$1,332	52%
Roofs and Parking Shelter (19.8 kWp)	22,968	\$2747	103%

Table 15: Arts Centre Solar Harvests, Energy Savings and Consumption Impacts

North and south rooftop systems together with the example solar parking shelter would result in Net-Zero electrical energy use based on 2018 consumption figures.

4.6 Art Centre Solar PV Installations Budget Costing

Approximate installed budget costing for example Art Centre demonstration systems 4 – 10 kWp systems and ultimate capacity is summarized in Table 16Table 12. Note that solar PV systems are PST exempt in BC.

PV System Size and Location	Budget Installation Cost (Excluding Taxes)
North Roof - Section 1 (5.1 kWp)	\$13,260 (\$2.60/Watt)
South Roof - Section 2 (5.1 kWp)	\$13,260 (\$2.60/Watt)
Both Roofs (10.2 kWp)	\$24,480 (\$2.40/Watt)
Parking Shelter (9.6 kWp)	\$38,400 (\$3.90/Watt)
Roofs and Parking Shelter (19.8 kWp)	\$62,880 (\$3.18/Watt)

Table 16: Approximate Installed Costing for Selected Art Centre Solar PV Systems

4.7 Art Centre Solar PV Feasibility Conclusions

Rooftop array placement is somewhat constrained by physical obstacles and shading but well performing demonstration systems (4 – 10 kWp) could be accommodated using one of or both north and south roof sections. The north roof membrane is much newer making it a better choice over the south roof for systems up to 5.1 kWp. Up to 10.2 kWp could be accommodated using both north and south roof, and up to 19.8 kWp using a solar parking shelter on the south wall of the building. With the BC Hydro SGS Rate 1300 applying, energy is valued at \$0.1139/kWh; making the business case for solar PV more attractive than city hall.

Projected key metrics for a 4.2 – 10.2 kWp rooftop demonstration solar PV system include:

- BC Hydro grid energy consumption reduction by 26% – 53%
- After tax annual electrical energy cost savings of \$708 - \$1416 (at 2019 rates)
- Before tax (GST only) estimated installation costs of \$13,260 - \$24,480

Projected key metrics for an ultimate 19.8 kWp capacity with a solar parking shelter:

- BC Hydro grid energy consumption reduced to Net-Zero
- After tax annual electrical energy cost savings of \$2747 (at 2019 rates)
- Before tax (GST only) estimated installation costs of \$62,880

Reconfiguration or upsizing of the main panel will be required to accommodate a 4.2 – 10.2 kWp demonstration system, or addition of a 400 A service splitter if expansion beyond 10.2 kWp is desired.

Projected costs assume roof structures can accommodate the additional deadload associated with ballasted racking systems. A professional structural review is required to verify whether a ballasted racking strategy would be acceptable.

5. Professional Structural Review

Incorporating building rooftop solar PV has structural and electrical impacts which must be carefully considered. While we have assessed and advised on solar electrical impacts in this report, a professional structural review is required to confirm acceptability for solar PV rooftop solutions proponents might propose.

For these existing buildings, ballasted racking would deploy quickly, and minimize membrane penetrations required for securing PV systems to the rooftop. Depending on site wind and seismic loads as well as array geometry and size, ballasted racking could add 2 – 8 psf (or more) deadload under PV array footprints over solely mechanically attached racking. Mechanically attached racking reduces deadload but can require extensive effort to properly anchor to the roof structure along with significant membrane cutting/repair. A mixture of ballasting with sparse mechanical anchoring can provide a compromise when use of one method solely is not possible.

Professional structural assessment in advance will confirm rooftop PV system installation viability, and provide clear structural constraints to which future solar PV installations will need to comply.

We estimate structural review cost ranges to be as follows assuming inspections can be completed for the three buildings in a single trip by local (Thompson-Okanagan) service provider:

- **City Hall:** \$2500 - \$3500 (Likely less if original structural drawings available).
- **Fire Hall No. 3:** \$1500 - \$2500
- **Art Centre:** \$1500 - \$2500

6. On-Going Solar PV Systems Maintenance Costs

While grid-connected solar PV system maintenance requirements are generally minimal, we suggest the following routines and costs be kept in mind.

- a) **Routine Equipment Monitoring** – (Estimated 6 hrs/year). Once monthly web-based system monitoring checks to confirm on-going normal operation of solar modules and inverter(s).

- b) **Module Soiling Checks and Cleaning** – (Estimated 6 hrs/year). Bi-annual inspection and simple cleaning with water hose as required. Dust, bird droppings, and other soiling reduces solar module energy production. In our climate regular rainfall is usually sufficient to keep major soiling at bay. Some owners have found rinsing panels with a water hose and sponge (for stubborn soiling) to be helpful; eg. in Mar and again in Aug. Others choose to rinse panels only if routine web monitoring suggests a soiling problem with particular solar modules.

- c) **Racking Inspection** – (Estimated 1 hr/year). Ballasted racking vendors recommend ballast placements be inspected once per year to ensure ballast blocks have not shifted out of place due to expansion/contraction, seismic activity, etc.

- d) **Inverter Replacement** – (Once per system life cycle). Solar PV module life is typically assumed to be 30 years though systems can last much longer. Conventional wisdom suggests budgeting for one inverter replacement during the lifetime of the solar modules. Extended inverter warranties out to 25 years are increasing available making inverter replacement budgeting less of a concern. A string inverter replacement for 4 – 10 kWp demonstration systems would presently be in the order of \$2500 - \$4000. Costs would vary if micro-inverters were used versus a string inverter.

Appendix A: Ballasted Racking Installation Examples

6.4 kWp Array using Ballasted Racking – Britannia Mine Museum, Britannia BC



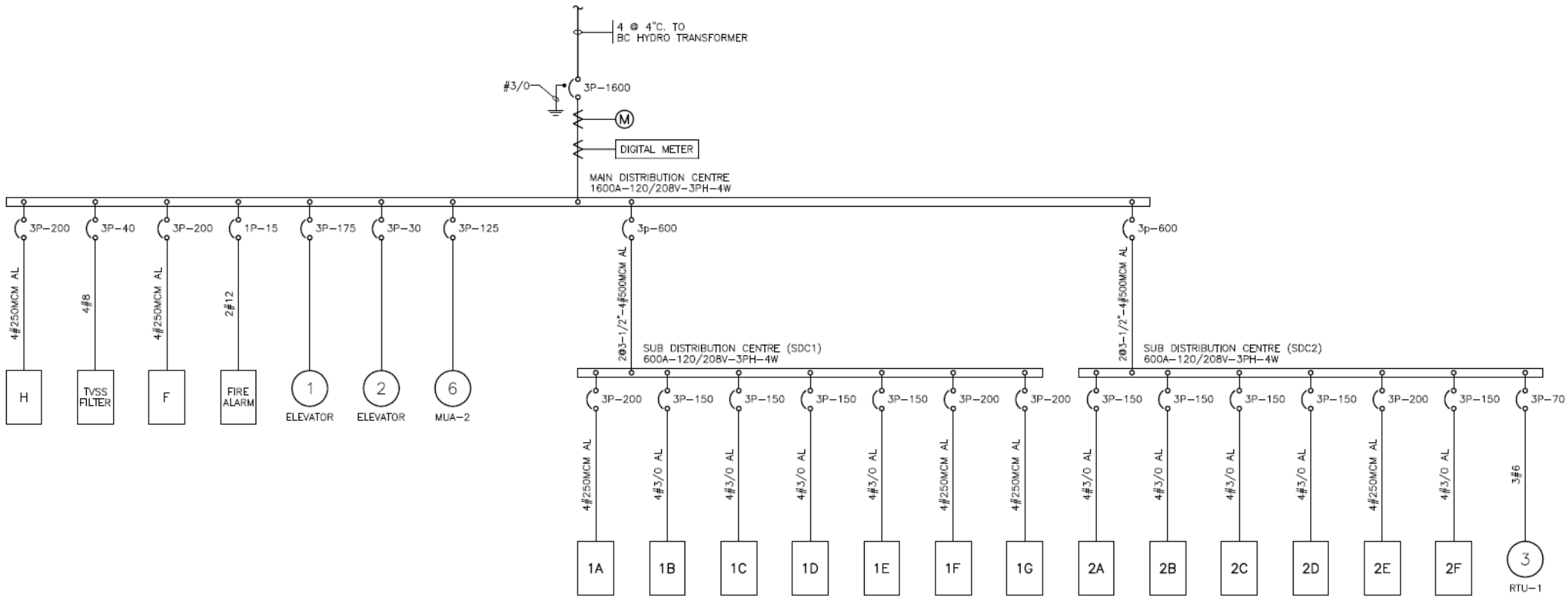
10.2 kWp Array using Ballasted Racking – Thompson Rivers University, Kamloops BC



24.5 kWp Array using Ballasted Racking – Nicola Valley Institute of Technology, Merritt BC



Appendix B: City Hall Electrical Single Line Drawing



SINGLE LINE DIAGRAM
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